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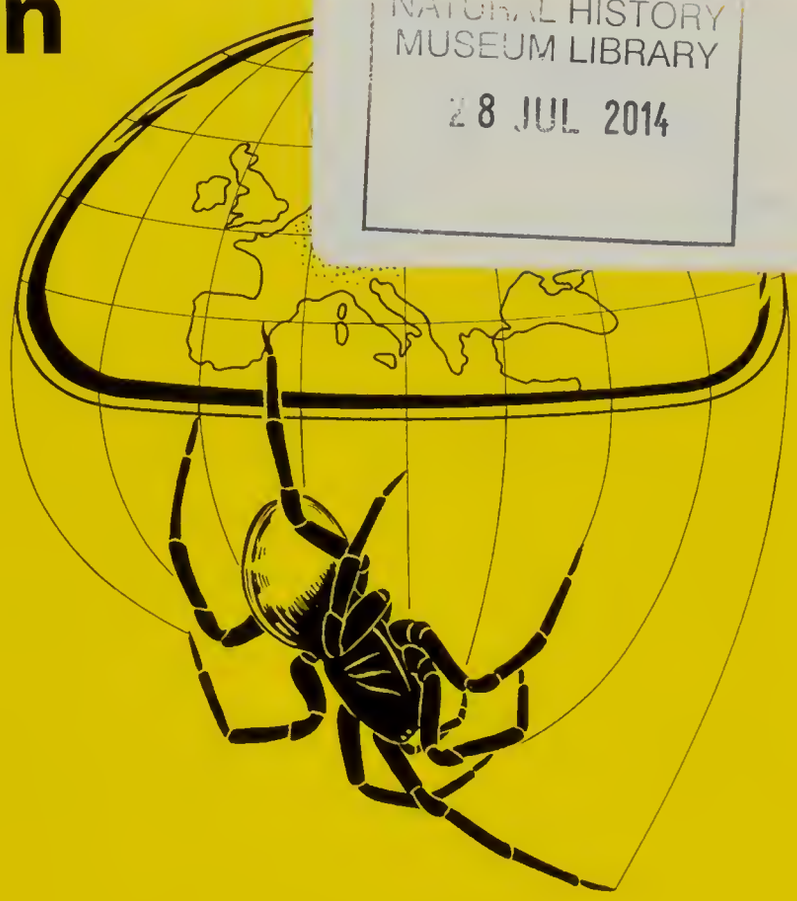

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Karlsruhe, Mai 2014

First record of the exotic spitting spider *Scytodes fusca* (Araneae, Scytodidae) in Central Europe from Germany and Slovakia

Anna Šestáková, Ľudmila Černecká, Jonathan Neumann & Nils Reiser

doi: 10.5431/aramit4701

Abstract. The spitting spider *Scytodes fusca* Walckenaer, 1837 is recorded for the first time in Central Europe from both Germany and Slovakia. The species was found in two localities, within the Botanical Garden in Bratislava (Slovakia), specifically from a heated greenhouse with high humidity, and the "Tropical Islands", a tropical holiday resort in Krausnick (Germany). It seems that this Pantropical species has probably been introduced here along with imported plants. A description of diagnostic characters, as well as figures, is given.

Keywords: artificial tropical ecosystem, botanical garden, first record, introduced species

Zusammenfassung. Neunachweis der exotischen Speispinne *Scytodes fusca* (Araneae, Scytodidae) in Mitteleuropa aus Deutschland und der Slowakei. Die Speispinne *Scytodes fusca* Walckenaer, 1837 konnte erstmals für Mitteleuropa in Deutschland und der Slowakei nachgewiesen werden. Die Funde stammen aus dem Botanischen Garten in Bratislava (Slowakei) sowie aus dem Freizeitbad „Tropical Islands" in Krausnick (Deutschland). Es wird vermutet, dass die pantropische Art durch Zierpflanzen eingeschleppt wurde. Die charakteristischen Merkmale der Art werden beschrieben und abgebildet.

The genus *Scytodes* consists of 215 species and 4 subspecies distributed worldwide with the largest diversity (>100 species) in the Neotropical region. The majority of them are found in Brazil (76 species) (Rheims & Brescovit 2009, Platnick 2013). Spitting spiders are well known for their unusual hunting technique which involves spitting a sticky mass. They attack other arthropods by ejecting a mixture of silk and glue at them, immobilizing the prey long enough to allow safe envenomation (Suter & Stratton 2013).

Previously, only one species of the genus, *Scytodes thoracica* (Latreille, 1802), was known from Central Europe. In Europe nine species of *Scytodes* have been recorded, plus three species occurring only in the Canary Islands. Most of them are only known from the Mediterranean region, but four Pantropical species have been imported into Europe: *Scytodes fusca* Walckenaer, 1837, *S. longipes* Lucas, 1844, *S. lugubris* (Thorell, 1887) and *S. venusta* (Thorell, 1890) (Brignoli 1976, van Helsdingen 2012, Nentwig et al. 2013, Platnick 2013). The new spider for the Central European arachnofauna reported here, *S. fusca*, is known from the Americas, tropical Africa, Asia (from Indomalaya to Japan) (for more details see Brignoli 1976) and southern Europe (Cardoso 2011).

The spitting spider *S. fusca* is known to be synanthropic, having adapted to life inside houses in Brazil (Brescovit & Rheims 2000, Araujo et al. 2008). In Australia, it seems to be communal-territorial, living in large colonies and practicing a primitive form of maternal care (Bowden & Jackson 1988, Bowden 1991, Yap et al. 2011).

Methods

Three Botanical Gardens were sampled: two in Slovakia (Bratislava, Košice) and one in the Czech Republic (Brno). Specimens were found in only one of them, in Bratislava (Slovakia); and only in one of three tropical rooms of the greenhouse. Specimens were collected from their webs found beneath stones. In Germany all specimens were found in the tropical holiday resort "Tropical Islands" in Krausnick (near Berlin). Most of the spiders were also discovered beneath objects, as in Slovakia.

Specimens were identified using Nentwig et al. (2013). The vulva was macerated in 4 % hydroxide solution and dyed in a water solution of Amido Black. Photographs were taken using EOS Utility software

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Fig. 1: Female of *Scytodes fusca* with egg sack. – Photo: A. Šestáková

and a Canon EOS 1100D digital camera connected to a Zeiss Stemi 2000-C stereomicroscope. Digital images were montaged and edited using Photoshop CS6. The material is preserved in 70 % ethanol and deposited in the The Western Slovakian Museum in Trnava and in the private collections of Nils Reiser and Jonathan Neumann. One female was sent to Arno Grabolle (Weimar) and one to Tobias Bauer (Stuttgart).

Results and discussion

Material examined

Females with egg sacks (Fig. 1) and numerous juveniles were observed in both countries. In Germany several adult males were found, but in Slovakia only one subadult male was collected; which matured under laboratory conditions.

GERMANY: 2 ♀♀, 2 juv (19 January 2013); 1 ♂, 7 ♀♀, 2 juv (5 March 2013); 2 ♂♂, 4 juv (7 March 2013): heated hall of "Tropical Islands", Krausnick, 50°2'20.48"N; 13°44'54.75"E, 78 m a.s.l., leg. J. Neumann & N. Reiser.

SLOVAKIA: 1 juv (12 December 2012); 2 ♀♀, 1 juv (25 April 2013), 1 ♂ (collected as subadult 31 July 2013): in one of three heated greenhouses in the Botanical Garden of Comenius University, Bratislava, 48°8'49.2"N; 17°4'20.97"E, 148 m a.s.l., leg. M. Holecová & A. Šestáková.

Diagnosis

This species could be confused with *Scytodes velutina* Heineken & Lowe, 1832 in Europe. Females of *S. fusca* have an epigynal fovea as wide as high, not narrow as in *S. velutina*, and the spermathecae have long, recurved stalks; very short in *S. velutina*. The carapace is usually much darker so the pattern is hardly visible, in comparison to *S. velutina* with a visible pattern. Males and juveniles can be distinguished by distinct patterns of the carapace and abdomen. Male bulbus with long, narrow terminal portion in comparison to the broad one in *S. velutina* (Brignoli 1976, Saaristo 1997).

Description

Medium sized and short-legged species (Valerio 1981). Females (ca. 6 mm, carapace 2.5 – 3.0 mm) are dark, without distinct pattern on habitus; legs are uniformly brown with darker femora (Figs 2a, b). Vulva with reduced atrium, one pair of small spermathecae with recurved stalks and – under epigastrium – more or less triangular foveae (Fig. 2c).

Males (4.0 – 5.5 mm, carapace ca. 2.5 mm) with distinct pattern on carapace and transverse pale and dark stripes on abdomen (Figs 3a, b). Legs uniformly yellowish. Bulbus has a slender terminal portion (Figs 3c, d). Juveniles with distinct patterns as in males (Fig. 4).

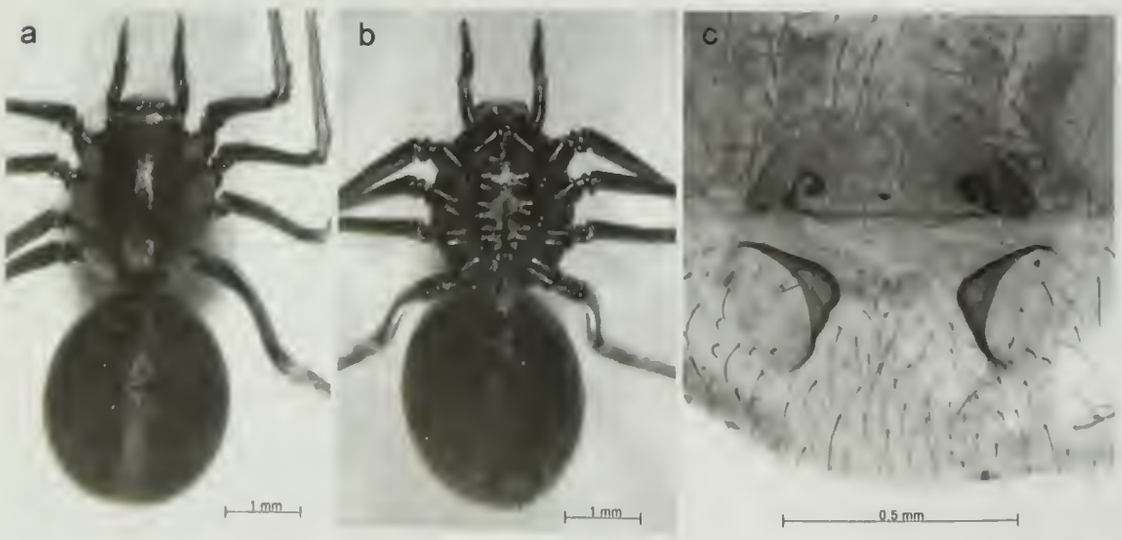

Fig. 2: Female habitus of *Scytodes fusca*. a) dorsal view; b) ventral view; c) vulva, macerated. – Photo: A. Šestáková

Fig. 3: Male habitus of *Scytodes fusca*. a) dorsal view; b) ventral view; c – d) left male palp, c) prolateral, d) retrolateral. – Photo: A. Šestáková

Distribution and natural history

The spitting spider *Scytodes fusca* was originally described from Cayenne, French Guiana (Walckenaer 1837). Other historical records have been reported from the Afrotropics (e.g. Lessert 1939, Millot 1941), Australasia (e.g. Chrysanthus 1967), Indomalaya (e.g. Doleschall 1859, Kulczyński 1911) and the Neotropics (e.g. Taczanowski 1872, Simon 1891, Cambridge 1899, Banks 1903, 1909, Mello-Leitão 1918). Besides the tropics, it was also introduced to less suitable regions like the Nearctic (Paquin et al. 2008) and Palaearctic (Wang et al. 1985, Ono 2009, Cardoso 2011), although it appears restricted here to Botanical Gardens (Singapore: Brignoli 1976; Slovakia: present paper) and similar artificial tropical ecosystems (Canada: Paquin et al. 2008; Germany: present paper). Van der Hammen (1949) found a single specimen of a

Fig. 4: Juvenile habitus of *Scytodes fusca*. a) dorsal view; b) ventral view. – Photo: A. Šestáková

Fig. 5: Underside of a stone showing one female of *Scytodes fusca* (circle) with two webs (arrows) belonging to female and juvenile. – Photo: A. Šestáková

Scytodes species, identified as *S. fusca*, in the greenhouse of the Botanical Garden in Leiden (the Netherlands). According to van Helsdingen (1999) it was misidentified with *S. venusta*. This species has never been found again in the Netherlands (van Helsdingen pers. comm.).

Although it was described as native to French Guiana, it is commonly associated with human habitations throughout Central and South America (Valerio 1981, Brescovit & Rheims 2000). In its natural habitat, it can be found in dark, dry places, such as the underside of rocks, under loose tree bark, in the nests of small mammals (Valerio 1981, Brescovit & Rheims 2000) and also in caves (Yap et al. 2011). It is a slow-moving, nocturnal spider that prefers crevices and cavities, and is thus not easy to find. We presume it was imported into Central Europe together with plants, as was the case in Quebec, Canada, where this species was found on foliage of palm trees in interior landscaping that mimicked Neotropical rainforests (Paquin et al. 2008). "Tropical Islands" in Germany is quite new (opened in 2004) and plants were imported directly from Thailand and Costa Rica (Green pers. comm.).

The populations in both locations in Germany and Slovakia seem to be large. Our observations recorded this species mainly on the underside of stones (Figs 5, 6a) and in "Tropical Islands" also under the bark of rotten trunks infested with termites. Specimens were observed in small webs consisting of a loose tangle of silk with a funnel retreat (Fig. 5). No specimens were found on walls – which would be typical for specimens living synanthropically – but in Germany several specimens occupied the crevices of the stone sculpture (Fig. 6b). Bowden & Jackson (1988) found some Australian populations of *S. fusca* to be communal-territorial, building web-complexes on tree trunks. We found no other mention of the sociality of this species in the published literature. During our observations, adult and subadult specimens were found living alone and, although small juveniles were in high abundance, they lacked web-complexes.

Scytodes fusca is a tropical species; therefore its occurrence in Central Europe is most likely restricted to artificial tropical ecosystems such as heated greenhouses or water-based theme parks. The only previously published record of this species in Europe is from Portugal (Cardoso 2011). Although informa-

Fig. 6: The specific habitat in the artificial tropical ecosystems of "Tropical Islands", Krausnick (Germany). a) stones; b) stone sculpture. – Photo: J. Neumann

tion about the habitat preferences of the Portuguese specimen were not published, we found that it was collected living in low garrigue vegetation near Monte Gordo in the Algarve during April, 1982 (Murphy pers. comm.). Moreover, Murphy mentioned he collected this species in many countries with a similar habitat to that in Portugal in the Mediterranean region, but never published these records. Thus a revision of the records of the similar-looking species *S. velutina* should be undertaken. Specimens from Slovakia were found numerously in only one of the three tropical rooms of the greenhouse. The primary reason for this could be the presence of stones around the paths, as these were missing in the other rooms. Brief observations in other Botanical Gardens in Košice and Brno suggested an absence of this species. Although both gardens had a factor in common – too few stones – the real reason could be simpler: the species *S. fusca* was never introduced there.

Acknowledgements

We thank the personnel of the Botanical Gardens of the Comenius University in Bratislava, P. J. Šafárik University in Košice, Mendel University in Brno and the Tropical Islands in Krausnick. Our thanks also go to Bernd Green for the wonderful cooperation and to Peter van Helsdingen, John Murphy and Pedro Cardoso for valuable information and publications. We are grateful to Mandy Howe for improving our English and remarks on the early manuscript version, and Theo Blick and the reviewers for their useful comments. Last but not least, we thank Milada Holecová, Jana Christophoryová and Katarína Krajčovičová for their help in the field.

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Revisiting the taxonomy of the rare and tiny comb-footed spider *Carniella brignolii* (Araneae, Theridiidae)

Barbara Thaler-Knoflach, Ambros Hänggi, Karl-Hinrich Kielhorn & Bodo von Broen

doi: 10.5431/aramit4702

Abstract. *Carniella brignolii* Thaler & Steinberger, 1988 was first described based on a male from Austria and still belongs to the rare, scarcely studied species. Based on material from Germany and Switzerland the hitherto unknown female now can be assigned and presented. In this context a new synonymy is also proposed: The cave-dwelling, troglomorphic *C. mihaili* (Georgescu, 1989) from Romania, originally established as new genus *Marianana,* is synonymised with *C. brignolii.*

Keywords: *Carniella mihaili,* cave-dweller, description, female, *Marianana*, new synonymy

Zusammenfassung. Ergänzungen zur Taxonomie der seltenen Zwergkugelspinne *Carniella brignolii* (Araneae, Theridiidae). *Carniella brignolii* Thaler & Steinberger, 1988 wurde nach einem Männchen aus Österreich erstmals beschrieben und gehört noch immer zu den seltenen und wenig untersuchten Arten. Mit rezentem Material aus Deutschland und der Schweiz kann nun das bisher unbekannte Weibchen zugeordnet und dargestellt werden. In diesem Zusammenhang wird außerdem eine neue Synonymie vorgeschlagen: Die höhlenbewohnende, troglomorphe *C. mihaili* (Georgescu, 1989) aus Rumänien, ursprünglich Typusart der neuen, inzwischen eingezogenen Gattung *Marianana*, wird mit *C. brignolii* synonymisiert.

The genus *Carniella* was first established by Thaler & Steinberger (1988) based upon a single European species, *C. brignolii*, from Carinthia, the eponymous region in Austria. Apparently, the generic nomenclature is rooted in the ancient name "*Carnia*" for Carinthia. Several species from Southeast Asia and one from Africa have been added in the last decades (Miller 1970, Wunderlich 1995, Knoflach 1996, Ono et al. 2007; see also Platnick 2014). Nae (2012) transferred a cave-dwelling, troglomorphic species described by Georgescu (1989) from Romania, *Theonoe mihaili*, into *Carniella*, and thus added a second European species to the genus.

The most prominent character of *Carniella* is the clypeal modification of the male (Thaler & Steinberger 1988, Knoflach 1996), which easily allows classification at generic level. Moreover, the male genital organ shows particular characteristics, such as a basal position of the cymbial hook and the absence of tibial trichobothria (Knoflach 1996, Agnarsson 2004).

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Females are less conspicuous. All representatives are small-sized, with a body length of approximately 1 mm. According to their dwarfish appearance and their hidden subterranean life, records are rare and the state of knowledge scanty.

Here we present new taxonomic amendments for the type species *C. brignolii* from Europe, including the description of the female based on material from Germany and Switzerland and a new synonymy, which reveals that the female was already known under another species name. A male with an uninflated genital organ previously recorded by Hänggi & Stäubli (2012) allows synonymisation with *C. mihaili.*

Material and methods

Specimens were first examined and arranged using a Leica Wild M8 stereoscopic microscope. Male and female genitalia were dissected and studied as temporary mounts by submerging them in glycerine on half-covered, hollow slides under a Wild M20 compound microscope equipped with a drawing tube and micrometer eyepiece. Owing to the scarcity of the material legs were not removed and instead measurements had to be taken from leg drawings from the entire specimens placed on glycerine slides. As a consequence, some of the limbs could not be oriented exactly horizontal to the optical axis of the microscope, as if they were separated from the body.

Abbreviations: bH basal haematodocha, E – embolus, MA – median apophysis, P – "paracymbium" or cymbial hook, S – subtegulum, T – tegulum, V – protrusion of basal haematodocha (nomenclature of male palp mainly sensu Agnarsson 2004 and Agnarsson et al. 2007).

Depository and museum abbreviations: NMB Naturhistorisches Museum Basel, ZMB –Museum für Naturkunde Berlin

Results and discussion

Carniella brignolii Thaler & Steinberger, 1988

C. brignolii Thaler & Steinberger, 1988: Male, n. sp., p. 998, figs. 1-4, 9-15. Type locality Warmbad Villach, Carinthia, Austria.

C. b.; Le Peru, 2011: Male, p. 376, 436, figs. 663-664 (described and redrawn from Thaler & Steinberger, 1988).

C. b.; Hänggi & Stäubli, 2012: Male, p. 59, fig. 2, Zürich, Switzerland.

Marianana mihaili Georgescu, 1989: Female, n. gen., n. sp., p. 89, figs. 17-26. Type locality Movile Cave, Dobrogea, Mangalia, 43.82568 N/ 28.56068 E, 1-2 m a.s.l., SE-Romania. **nov. syn.**

Theonoe mihaili; Le Peru, 2011: Female, p. 411, 468, fig. 794 (described and redrawn from Georgescu, 1989).

Carniella mihaili; Nae, 2012: Male, p. 68, figs. 1-12, Movile Cave, Romania.

Material examined

1 ♂ (NMB; ARAN-20603), Switzerland, Zürich, freight terminal, in pitfall-trap between track gravel, 2.6.-16.6.2009, N47.3834/E8.5167 (+- 10m), 400 m a.s.l., leg. Anna Stäubli (Hänggi & Stäubli 2012). 1 ♀ (NMB, ARAN-25740), Switzerland, Valais (Wallis), Miège, edge of organic parcel of vineyard, 27.5.1997, N46.31459/E7.55782 (+- 50m), 720-740 m a.s.l., pitfall-trap, leg. M. Genini (site "MB" in Genini 2000). 1 ♀ (ZMB; B602), Germany, Brandenburg, Neuenhagen (Bad Freienwalde), gravel pit, in pitfall-trap on coarse sand, 2.5.-2.6.1997, N52.83982/E14.02679, 2 m a.s.l., leg. M. Sommer, coll. Bodo von Broen.

Carniella brignolii, the type species of the genus *Carniella* Thaler & Steinberger, 1988, was so far known only from the male, at least nominally. The corresponding female was described almost at the same time by Georgescu (1989) as new genus *Marianana* and new species *M. mihaili*; see synonymy list.

Diagnosis

Males of *Carniella brignolii* are easily recognised by their modified clypeus (Fig. 4) and the conformation of their palpal sclerites (Figs. 5-8; further figures see Thaler & Steinberger, 1988): Embolus complex with distal spiral, tip of cymbium with noticeable recess and basal haematodocha with a specific, conspicuous apophysis, which largely protrudes beyond the male palp when expanded (V, Thaler & Steinberger 1988, Nae 2012 sub *C. mihaili*). As in other members of the genus, the "paracymbium" or cymbial hook is situated on the base of the cymbial retromargin, a conductor is missing and the palpal tibia lacks any trichobothria. Females show a rounded epigynal cavity with a clear septum.

Description of female

Colouration, measurements, somatic features (Figs. 1-3): Carapace, sternum and legs uniformly light brown, abdomen greyish. Carapace 0.44/0.50 mm long, 0.35/0.38 mm wide, sternum 0.29/0.31 mm long and 0.26/0.27 mm wide. Sternum tapering posteriorly. Chelicerae with three denticles on anterior margin of fang groove.

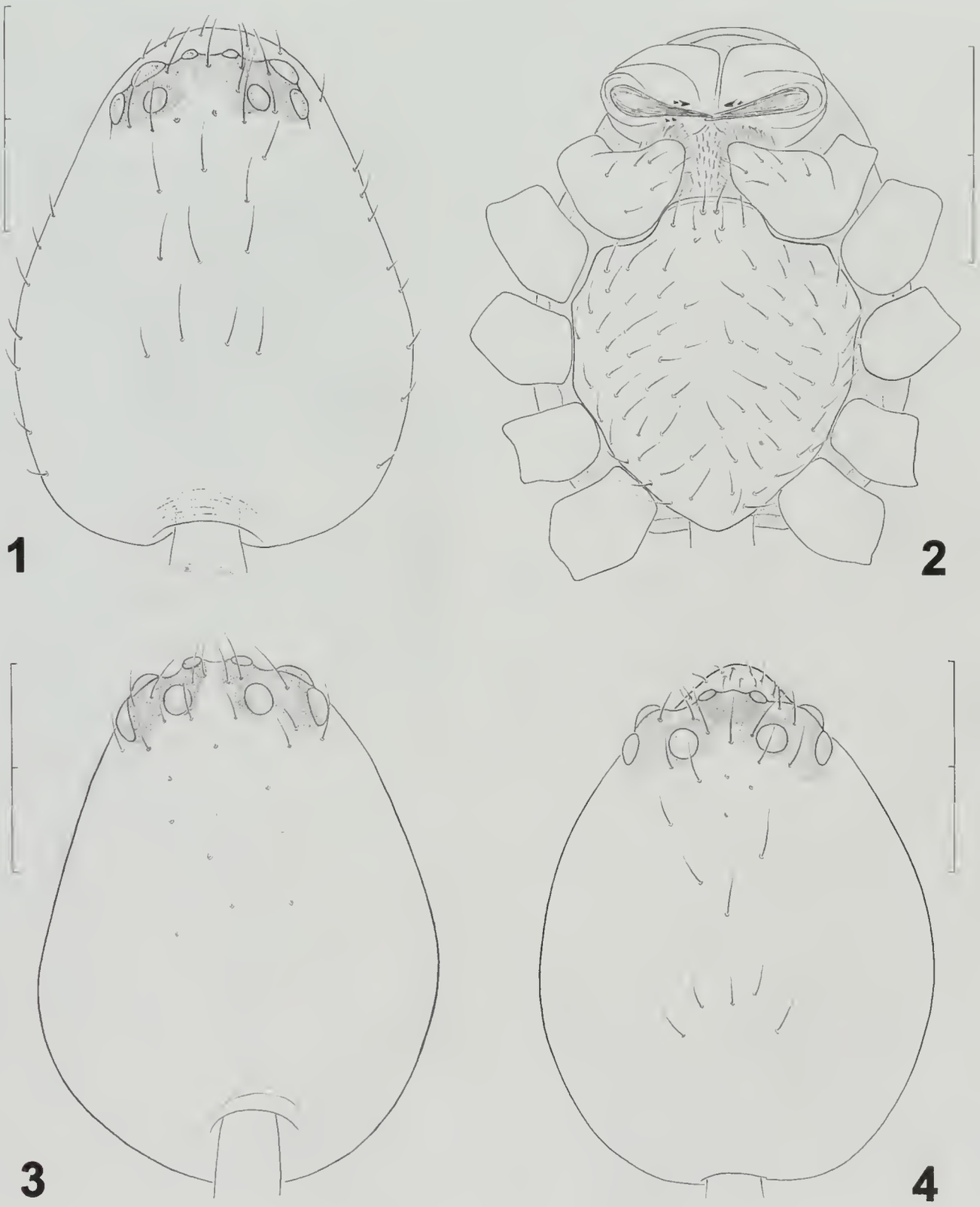
Leg measurements: Female from Brandenburg (mm): Femur/tibia/metatarsus/tarsus: Palp 0.20/0.08/-/0.16. Leg I 0.29/0.16/0.14/0.21. Leg II 0.28/0.16/0.12/0.19. Leg III 0.23/0.13/0.11/0.20. Leg IV 0.31/0.20/0.13/0.23.

Legs: 4123. Trichobothrial pattern (numbers of prodorsal/retrodorsal trichobothria of tibiae): I-II 1/2, III 2/1, IV 2/2. Metatarsi I-II with 1 trichobothrium, its position on I 0.35, on II 0.45. Metatarsi III and IV without trichobothrium. Tarsi and distal metatarsi ventrally with serrate bristles. Tarsal organ I-IV (I 0.32, II 0.35, III 0.31, IV 0.32). Tarsi I-IV 1.5, 1.6, 1.8 and 1.8 times longer than metatarsi.

Epigynum/vulva (Figs. 9, 11, 13): Epigynal cavity is a rounded, 0.1 mm wide, well outlined field, which is clearly divided along the midline by a longitudinal ridge. Copulatory orifices not clearly traceable. Copulatory ducts rather short, presumably starting at midline, running forwards at short distance and then backwards, entering at the anterior region of the receptacula seminis. Recurring part of ducts sclerotised. Receptacula seminis globular, at side margins of epigynal cavity.

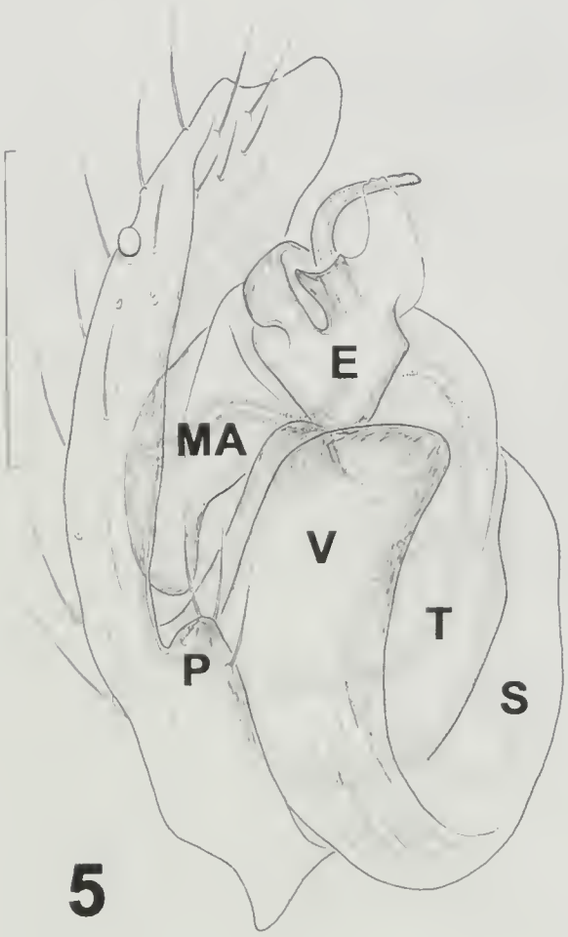
Synonymy

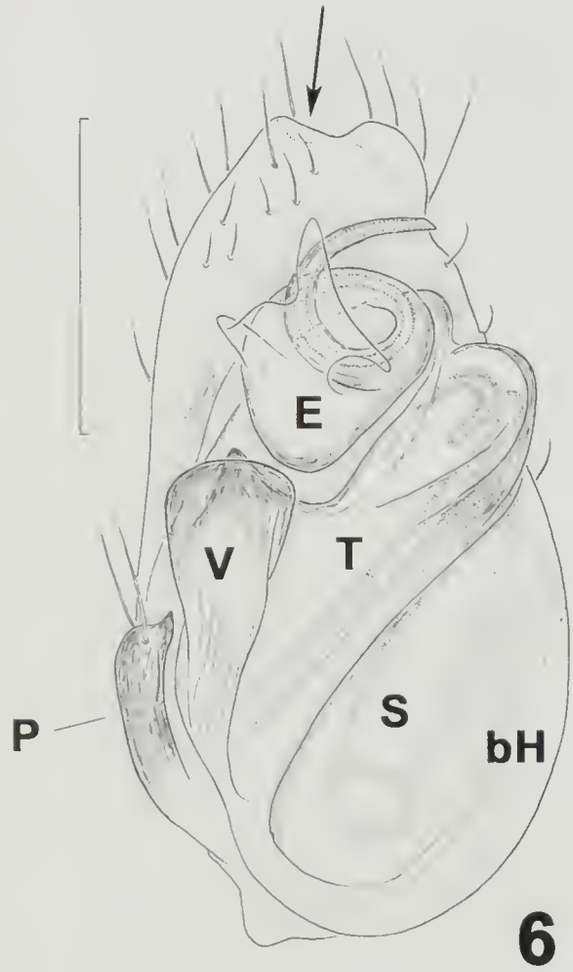
We consider *Carniella mihaili* as a new synonym of *C. brignolii*. Originally, *C. mihaili* was decribed by

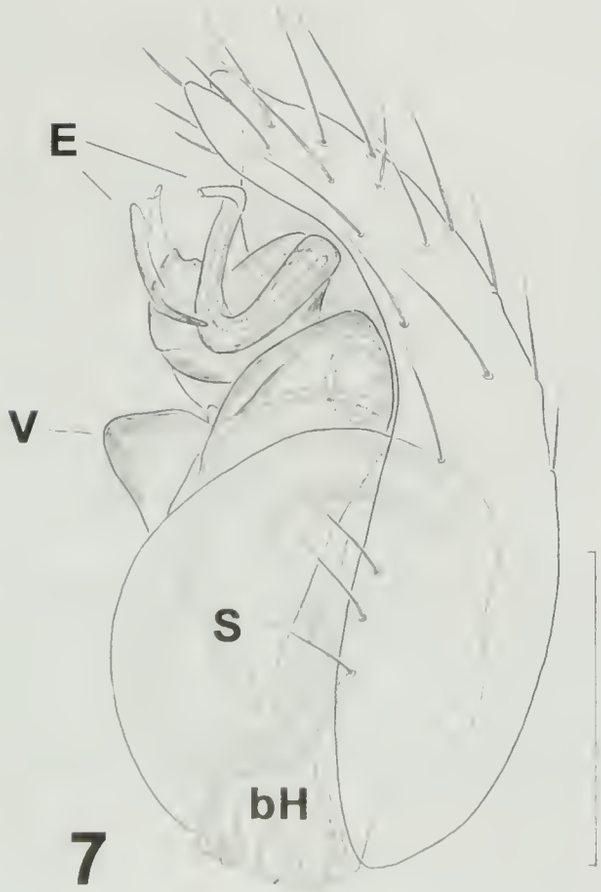


Figs. 1-4: *Carniella brignolii* Thaler & Steinberger, 1988. Female from Switzerland, Valais (1-2) and from Germany, Brandenburg (3). Male from Switzerland, Zürich (4). Carapace, dorsal view (1, 3-4) and prosoma, ventral view (2). Scale lines: 0.2 mm.

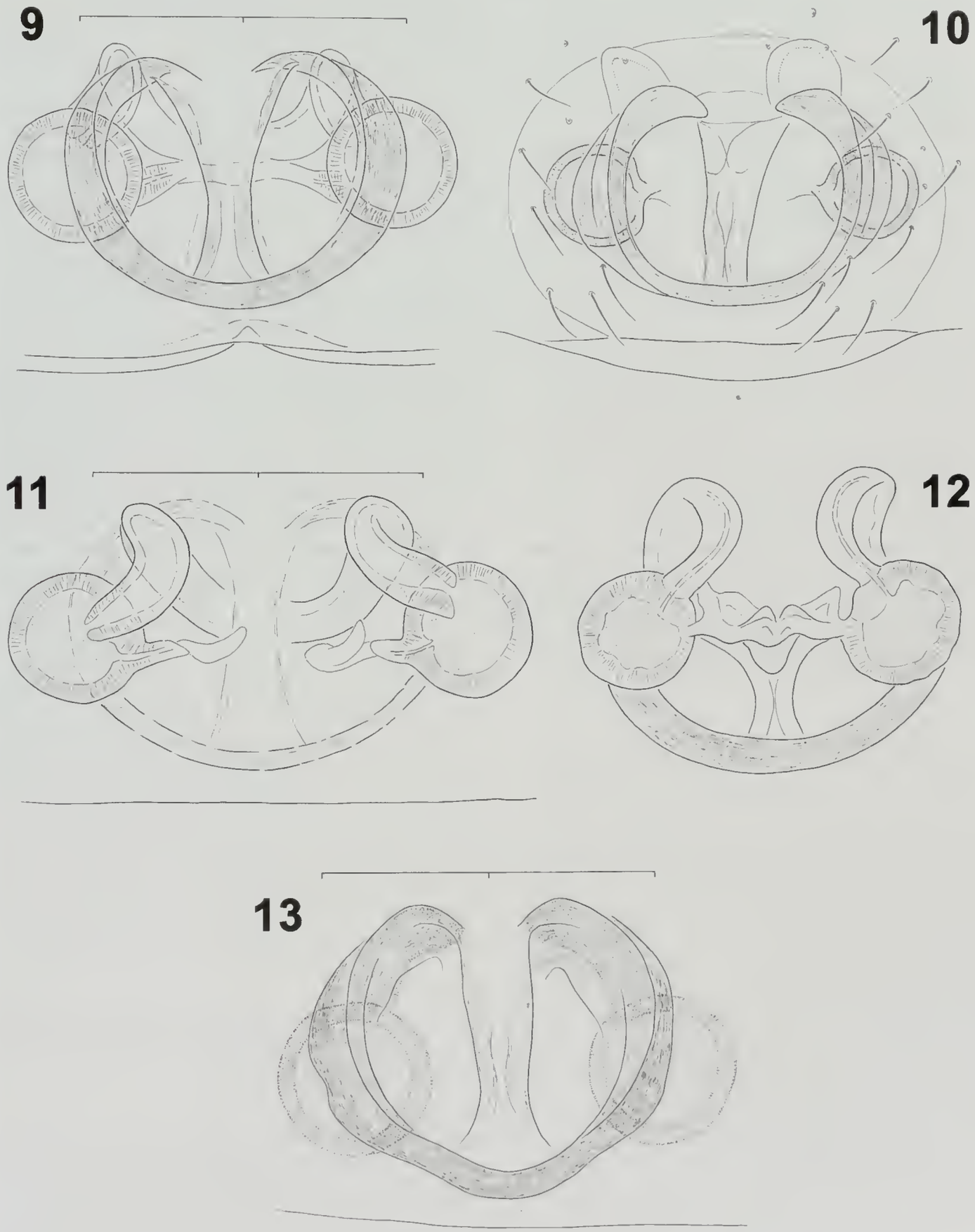
Georgescu (1989) based on a single female representing the type species of the new genus *Marianana*. This monotypic genus later was synonymised by Wunderlich (2008) with *Theonoe* (see also Platnick 2014). With the additional knowledge based on males, Nae (2012) transferred *T. mihaili* into *Carniella* and thus the genus *Marianana* has to be listed as a junior synonym of *Carniella*.







Figs 5-8: *Carniella brignolii* Thaler & Steinberger, 1988, from Switzerland, Zürich. Right male palp without tibia, in retrolateral (5), ventral (6) and prolateral view (7). Outlines of distal cymbium of left palp in dorsal view (8). Arrow points to broken tip of cymbium (6). Scale lines: 0.1 mm.



Figs. 9-13: *Carniella brignolii* Thaler & Steinberger, 1988. Female from Switzerland, Valais (9, 11), Germany, Brandenburg (13) and Romania (10, 12; taken from Georgescu 1989; sub *C. mihaili*). Epigynum/vulva, ventral (9, 10, 13) and dorsal view (11, 12). In Fig. 13 the epigynum was drawn from the entire female without being dissected. Scale lines: 0.1 mm.

Fig. 14: Distribution of *Carniella brignolii*. Austria: Warmbad Villach (Thaler & Steinberger 1988). Belgium: Corphalie site along River Meuse (Baert & Van Keer 1991). Germany: Bavaria, Halblech, Ostallgäu (Dröschmeister 1995); Brandenburg (see above). Switzerland: Zürich (Hänggi & Stäubli 2012); Valais, Miège (see above). Romania: Movile Cave (Nae 2012).

The excellent and highly accurate descriptions of Georgescu (1989) of the female and Nae (2012) of the male allow synonymisation of *C. mihaili* based on the literature. Nae (2012) already indicated noticeable similarities with *C. brignolii* regarding the male palp, but at that time only males with fully inflated palps were known and illustrated (figures see Thaler & Steinberger 1988). In the cave-dwelling males from Romania the palpal membranes were not expanded and thus the obvious protrusion of the basal haemotodocha, 'typical' for *C. brignolii*, was hidden (abbreviated as "V" in Thaler & Steinberger 1988). A male with one uninflated genital organ (Figs. 5-7), previously recorded by Hänggi & Stäubli (2012), now strengthens the synonymy.

The following characters argue for the synonymy suggested herein. In the male palp, the basal haematodocha ends as a marked, sclerotised apophysis, which largely protrudes beyond the bulbus in the expanded palp ("V" in Thaler & Steinberger 1988 and Nae 2012). The cymbium shows distally a typical recess (Fig. 8; tip of cymbium unfortunately broken in the palp presented here, see Fig. 6). The embolus is complex with a distal embolus spiral and several small, sclerotised projections as well as a larger hyaline one (abbreviated as TA in Thaler & Steinberger 1988 and EB in Nae 2012). The females agree in the rounded shape of the epigynal cavity with a clear septum, in the course of the copulatory ducts and the position of the receptacula (see Georgescu 1989; and Figs. 9, 13 vs. 10 and 11 vs. 12). Clypeal modification, shape of the sternum and carapace, size parameters and cheliceral dentation are likewise in accordance.

There still remains the problem of eye reduction. In the Romanian specimens from Movile Cave the median eyes are completely reduced. Reduction or loss of eyes is regarded as being among the morphological adaptations to subterranean and cave life (Růžička 1999, 2009, Růžička et al. 2013). A wide range of variation in eye size is known also for other soil living spiders, e.g. in the genus *Porrhomma* (see Růžička 2009, Růžička et al. 2013). Therefore, it is suggested that this character is not appropriate for species discrimination in the particular case of *Carniella brignolii* and *C. mihaili*, as no other noticeable differences exist.

Distribution

The distribution of *C. brignolii* has just recently been updated by Hänggi & Stäubli (2012). Few, scattered records come from Austria (Thaler & Steinberger 1988), Belgium (Baert & van Keer 1991), Germany (Dröschmeister 1995) and Switzerland (Hänggi & Stäubli 2012), see Fig. 14. For further details and habitat preferences see Hänggi & Stäubli (2012). With the new synonymy the range of distribution can be expanded to SE-Europe (specifically Romania) where a population with adaptations to cave life exists.

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Die Gemeine Baldachinspinne, *Linyphia triangularis* (Araneae: Linyphiidae), Europäische Spinne des Jahres 2014

Christoph Hörweg

doi: 10.5431/aramit4703

Abstract. The common hammock-weaver, *Linyphia triangularis* (Araneae: Linyphiidae), European spider of the year 2014. The European spider of the year 2014, *Linyphia triangularis* (Clerck, 1757), is presented. For the first time it is a linyphiid spider, a hammock-weaver. Its characteristics (e.g., ecology, habitat, web, phenology) are briefly described. The modality of the voting is given as well as numerous links to the supporting societies and to distribution maps.

Keywords: award, hammock-web spiders, popular

Zusammenfassung. Die europäische Spinne des Jahres 2014, *Linyphia triangularis* (Clerck, 1757), wird vorgestellt. Erstmals ist es eine Linyphiide, eine Baldachinspinne. Ihre Merkmale und Eigenschaften (z.B. Ökologie, Lebensraum, Netz, Phänologie) werden kurz beschrieben. Der Wahlmodus, die beteiligten Länder und zahlreiche Links zu den unterstützenden Gesellschaften und Verbreitungskarten werden genannt.

Die Gemeine Baldachinspinne *Linyphia triangularis* (Clerck, 1757) gehört zur Familie der Baldachinspinnen (Linyphiidae). Diese Familie stellt weltweit nach den Springspinnen (Salticidae) mit 4482 die meisten Arten (Platnick 2014). In Europa bilden die Baldachinspinnen mit 1248 Arten sogar die artenreichste Spinnenfamilie (Nentwig et al. 2014); in Mitteleuropa kommen rund 500 Arten vor.

Die Familie der Baldachinspinnen ist charakterisiert durch den Netzbau, viele Arten bauen – wie der Name schon sagt – dichte, horizontal ausgespannte, meist baldachinartige Netzteppich. Die Gemeine Baldachinspinne selbst ist, im Gegensatz zu vielen anderen Vertretern ihrer Familie, aufgrund ihrer

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Dieser Artikel ist Heiko Bellmann gewidmet, der am 7.3.2014 verstorben ist. Er hat die Initiative „Spinne des Jahres" immer mit seinen beeindruckenden Bildern unterstützt und die Spinnen dadurch richtig „anschaulich" gemacht.

eingereicht 25.3.2014, akzeptiert 5.4.2014, online 12.5.2014

Abb. 1/Fig. 1: *Linyphia triangularis* – Habitus. Foto/Photo: Heiko Bellmann

Abb. 2: *Linyphia triangularis* – baldachinartiges Deckennetz.
Fig. 2: *Linyphia triangularis* – sheet-web.
Foto/Photo: Heiko Bellmann

Größe und ihrer auffälligen Zeichnung auf dem Vorderkörper verhältnismäßig leicht zu identifizieren (Abb. 1).

L. triangularis besiedelt große Teile der Paläarktis, ihr Verbreitungsgebiet umfasst aber auch die gemäßigten bis subtropischen Zonen. Sie kommt außer auf Island in ganz Europa vor, ihre Höhenverbreitung reicht von der Ebene und Hügellagen bis hinauf in montane Gebiete. Die genaue Verbreitung im deutschsprachigen Raum bzw. in Europa ist den einzelnen Verbreitungskarten (Helsdingen 2013, CSCF 2014, Staudt 2014, weitere siehe unten) zu entnehmen.

Die Art ist hinsichtlich ihres Lebensraumes wenig spezialisiert. Als „Generalist" trifft man sie in nicht zu feuchten Wäldern ebenso an wie auf offenen Flächen, seien es Wiesen, Waldränder oder auch Parks und Gärten. Sie kann in allen geeigneten Lebensräumen sehr zahlreich vorkommen und wird (zumindest in der Ebene und im Herbst) als die wohl häufigste Spinne der Kraut- und Strauchschicht bezeichnet (Braun & Rabeler 1969, Hänggi et al. 1995).

Das Netz der Gemeinen Baldachinspinne wird meist niedrig (ca. 30 cm) über dem Boden, in Gräsern, Stauden und Sträuchern angelegt. Es besteht wie bei den meisten Arten der Familie aus einem nach unten gespannten horizontalen Netzteppich, über dem ein ca. 20 cm hohes Geflecht aus sehr lockeren „Stolperfäden" angelegt ist (Malt 1996) (Abb. 2). Die Höhe kann aber in Abhängigkeit von der Vegetation und der Jahreszeit variieren (Herberstein 1997). Die Spinne sitzt fast immer in Rückenlage an der Unterseite des Netzteppichs. Die Beute stößt meist gegen die Stolperfäden, welche auch nicht immer klebrig sein müssen (Peters & Kovoor 1991), und fällt dann auf den Netzteppich, wo sie von der Spinne erbeutet wird (Abb. 3). Das sind meist kleinere Insekten wie Zikaden, Blattläuse, Mücken, aber auch winzige Fliegen und Kleinschmetterlinge gehören zum Nahrungsspektrum (Turnbull 1962, Malt 1996).

Die Körperlänge beträgt bei beiden Geschlechtern etwa 5-7 mm. Der Vorderkörper ist beigebraun gefärbt, schwarzbraun gerandet und weist ein schwarzes Mittelband auf, das sich etwa in der Mitte des Vorderkörpers nach vorn teilt. Diese Zeichnung erinnert an eine Stimmgabel. Der Hinterkörper ist gelblich-weiß mit einem breiten braunen, dunkel gerandeten Mittelband, das mehrfach eingeschnürt ist, wodurch manchmal typische dreieckige Flecken zu sehen sind. Seitlich sind ebenfalls braune Bänder und Flecken sichtbar, die Unterseite ist dunkelbraun bis schwarz. Die Beine sind einfarbig beigebraun (Wiehle 1956, Bellmann 2006, Nentwig et al. 2014).

Männchen unterscheiden sich durch einen deutlich schmaleren Hinterkörper und vergrößerte Chelizeren (Kieferklauen). Auch geht die Färbung mehr ins rotbraune hinein (Abb. 4).

Abb. 3: *Linyphia triangularis* mit Beute.
Fig. 3: *Linyphia triangularis* with prey.
© ARABEL Image Bank: Pierre Oger

Verwechslungsmöglichkeiten sind v.a. mit *Linyphia tenuipalpis* Simon, 1884 gegeben, die etwas kleiner ist und auch etwas wärmere Lebensräume bevorzugt als *L. triangularis*. Bei *L. tenuipalpis* sind die erwachsenen Tiere schon etwas früher, von Juni bis Oktober, zu finden (Thaler 1983, Toft 1989). In Zweifelsfällen ist eine genaue Differenzierung nur durch eine Untersuchung der Geschlechtsorgane möglich. Nentwig et al. (2011) nennen die beiden Arten auch als Beispiel für die sogenannte Kontrastbetonung. Bei sympatrischen Vorkommen der Konkurrenten verschieben sich die Körpergrößen bei *L. tenuipalpis* zu kleineren, bei *L. triangularis* zu größeren Werten, dadurch kann unterschiedlich große Beute genutzt werden. Auf diese Weise wird die Nischenüberlappung verringert und die direkte Konkurrenz geringer (Toft 1980). Toft (1987) zeigt allerdings auch, dass die Mikrohabitate der beiden Arten fast identisch

Abb. 4: *Linyphia triangularis* – Weibchen links, Männchen (mit vergrößerten Chelizeren) rechts im Netz.
Fig. 4: *Linyphia triangularis* – female left, male (with large chelicerae) on the right.
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sein können, so dass andere Faktoren wie z.B. das Makrohabitat vielleicht die entscheidende Rolle bei der Nischentrennung spielen könnten.

Geschlechtsreife Tiere der Gemeinen Baldachinspinne treten von August bis Oktober auf. Paarungen finden in Mitteleuropa vor allem im August und September statt (Wiehle 1956, Braun & Rabeler 1969). Die Männchen halten sich zu dieser Zeit ständig im Netz der Weibchen auf. Zur Kopulation sitzt das Männchen ebenfalls in Rückenlage vor dem Weibchen und führt abwechselnd seine Taster (Pedipalpen) in die Geschlechtsöffnung (Epigyne) des Weibchens ein. Die Jungtiere überwintern im Eikokon (Bellmann 2006).

Linyphia triangularis ist prädestiniert als Spinne des Jahres: Sie ist nicht nur einer der häufigsten Vertreter dieser prominenten Spinnenfamilie mit wunderbaren, leicht sichtbaren Deckennetzen, sie zeigt auch interessante biologische Aspekte. Einer davon ist die sogenannte „Verkehrtfärbung", d.h. die Unterseite ist bei ihnen dunkler gefärbt als die Oberseite. Obwohl sie verkehrt unter dem Deckennetz hängen, sind die Tiere dennoch gut getarnt (Wiehle 1949). Zudem locken die Weibchen mit Sex-Pheromonen die Männchen ins Netz zur Paarung (Barth 2001), und die Männchen zeigen ein als „mate guarding" bezeichnetes Verhalten, bei dem sie selbst nach der Paarung noch einige Zeit beim Weibchen verbleiben, um es vor weiteren Männchen zu „schützen". So soll sichergestellt werden, dass es zu keiner weiteren Paarung mehr kommt, damit wirklich die eigenen Gene an den Nachwuchs weitergegeben werden (Toft 1989).

Auch in diesem Jahr ist der Herbst die geeignete Jahreszeit, der Spinne des Jahres zu begegnen. Die Netze kann man zuerst entdecken und dann lohnt es sich auf jeden Fall, einen genaueren Blick hineinzuwerfen!

Wahl der Spinne des Jahres

Die Spinne des Jahres wurde von 82 Arachnologinnen und Arachnologen aus 26 Ländern (Albanien, Belgien, Bulgarien, Dänemark, Deutschland, Finnland, Frankreich, Großbritannien, Irland, Italien, Kroatien, Liechtenstein, Mazedonien, Niederlande, Norwegen, Österreich, Polen, Portugal, Schweden, Schweiz, Serbien, Slowakei, Slowenien, Spanien, Tschechische Republik, Ungarn) gewählt.

Unterstützende Gesellschaften

Arachnologische Gesellschaft e.V. AraGes www.arages.de
Belgische Arachnologische Vereniging/Société Arachnologique de Belgique ARABEL www.arabel.ugent.be
The British Arachnological Society (BAS) www.britishspiders.org.uk
European Invertebrate Survey-Nederland, Section SPINED http://science.naturalis.nl/research/people/cv/eis/helsdingen/spinnen
European Society of Arachnology ESA www.european-arachnology.org
Grupo Ibérico de Aracnología (GIA) – Sociedad Entomológica Aragonesa (SEA) http://www.sea-entomologia.org/gia/
Naturdata – Biodiversidade online www.naturdata.com

Verbreitungskarten

Deutschland: http://spiderling.de/arages/Verbreitungskarten/species.php?name=lintri
Schweiz: http://lepus.unine.ch/carto/index.php?nuesp=9506&rivieres=on&lacs=on&hillsh=on&year=1990
Österreich: http://www.arages.de/files/Linyphia_triangularis_Oesterreich.pdf
Tschechische Republik: http://www.pavouci-cz.eu/Pavouci.php?str=Linyphia_triangularis
Benelux: http://www.tuite.nl/iwg/Araneae/SpiBenelux/?species=Linyphia%20triangularis
Großbritannien: http://srs.britishspiders.org.uk/portal.php/p/Summary/s/Linyphia%20triangularis
Europa: http://spiderling.de/arages/OverviewEurope/euro_species.php?name=lintri
http://www.araneae.unibe.ch/data/1256/Linyphia_triangularis
http://www.faunaeur.org/Maps/display_map.php?map_name=euro&map_language=en&taxon1=350574

Bilder bzw. Fotogalerien
http://spiderling.de/arages/Fotogalerie/Galerie_Linyphia.htm
http://wiki.eu-arachnida.de/index.php?title=Linyphia_triangularis

Wiki des Spinnen-Forums
http://wiki.spinnen-forum.de/index.php?title=Linyphia_triangularis

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Miscellaneous notes on European and African *Cheiracanthium* species (Araneae: Miturgidae)

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Abstract. The African species *Cheiracanthium furculatum* Karsch, 1879 was recognised as being introduced to Germany and is re-described and illustrated in the present study. *C. tenuipes* Roewer, 1961 is recognised as a junior synonym of *C. africanum* Lessert, 1921 (**new synonymy**); both subspecies of *C. strasseni* Strand, 1915, namely *C. strasseni strasseni* Strand, 1915 and *C. strasseni aharonii* Strand, 1915, are recognised as junior synonyms of *C. mildei* L. Koch, 1864 (**new synonymies**). Photographic images of the copulatory organs of the types of *C. cretense* Roewer, 1928, recently synonymised with *C. mildei*, are provided and discussed in the course of intraspecific variation in *C. mildei*. The female holotype of *C. rehobothense* Strand, 1915 is re-described and illustrated. Relations of *C. rehobothense* to other *Cheiracanthium* species are discussed.

Keywords: Africa, copulatory organs, Europe, intraspecific variation, introduction, new synonymies, taxonomy

Zusammenfassung. Verschiedene Anmerkungen über afrikanische und europäische *Cheiracanthium*-Arten (Araneae: Miturgidae). Die afrikanische Dornfingerspinnenart *Cheiracanthium furculatum* Karsch, 1879 wurde erstmals nach Deutschland eingeschleppt. In der vorliegenden Studie wird sie wiederbeschrieben und dargestellt. *C. tenuipes* Roewer, 1961 wird mit *C. africanum* Lessert, 1921 synonymisiert (**neue Synonymie**); beide Unterarten von *C. strasseni* Strand, 1915, und zwar *C. strasseni strasseni* Strand, 1915 and *C. strasseni aharonii* Strand, 1915, werden mit *C. mildei* L. Koch, 1864 synonymisiert (**neue Synonymien**). Fotographische Abbildungen der Kopulationsorgane der Typus-Exemplare von *C. cretense* Roewer, 1928, welche vor kurzem mit *C. mildei* synonymisiert wurde, werden im Rahmen der Untersuchung der intraspezifischen Variabilität von *C. mildei* diskutiert. Das Holotypus-Weibchen von *C. rehobothense* Strand, 1915 wird wiederbeschrieben und dargestellt. Beziehungen dieser Art zu anderen *Cheiracanthium*-Arten werden diskutiert.

In July 2012 a *Cheiracanthium* female was found (by chance) within a box of light green grapes from a supermarket in Spesbach, near Kaiserslautern in south-western Germany. The grapes were imported from the Meknès region, Morocco. The female specimen was kept and fed until it laid an egg-sac. Afterwards it was identified as *Cheiracanthium furculatum* Karsch, 1879. In the course of identification, all relevant African and Mediterranean *Cheiracanthium* species were considered. In addition, some species, which were deposited in the arachnid collection of the Senckenberg Research Institute, Frankfurt am Main, Germany, and were not assessed since their first description 50 or more years ago, were examined. One of them, *C. tenuipes*, was described by Roewer (1961) and three others by Strand (1915), namely *C. rehobothense* Strand, 1915, and the two subspecies *C. strasseni strasseni* Strand, 1915 and *C. strasseni aharonii* Strand, 1915. The present study re-describes *C. furculatum* and evaluates the status of the three above-mentioned species. Interestingly, the introduction of *C. furculatum* to Belgium was recently recognised and documented by Bosselaers (2013), who also reported on a possible introduction to Ireland.

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Material and methods

The spiders examined in the present study derive from natural history museum or private collections, which are listed below. Examinations and drawings were carried out with a Leica M 165 C stereomicroscope with a drawing mirror. Photos of preserved spiders and copulatory organs were taken with a Sony DSC W70 compact camera via the ocular of the stereomicroscope. Female copulatory organs were cleared from surrounding hairs and dissected. The (opaque) tissue surrounding the vulva was removed mechanically in order to have the best possible view on the different vulva-structures. In the illustrations of the present paper all epigynes are shown in ventral view and all vulvae are shown in dorsal view, except where otherwise noted.

All measurements (and all numbers listed next to the scale bars) are in millimetres (mm). In the

present study the "opisthosoma length" is regarded as length of the main part of opisthosoma only, thus without spinnerets and petiolus. Palp and leg lengths are listed as: total (femur, patella, tibia, metatarsus, tarsus). Leg formula (from longest to shortest leg) and leg spination pattern follow those in Bayer & Jäger (2010) and Bayer (2012). In leg/palp spination the limbs femur, patella, tibia and metatarsus (tarsus in palp) are listed in exactly this sequence. First, all spines on the prolateral surface of the respective limb are counted and listed, then those on the dorsal, then retrolateral and finally the ventral surfaces. Thus the resulting number is generally 4-digits. If a spination pattern of a certain limb article differs between the left and right sides, the pattern for the right article follows in curved brackets.

Abbreviations used in the text: ALE - Anterior lateral eye(s). AME - Anterior median eye(s). Juv. - Juvenile. PLE - Posterior lateral eye(s). PME - Posterior median eye(s). RTA - Retrolateral tibial apophysis. S.a. - Subadult.

Terminology of structures belonging to the copulatory organs is given as follows: The internal parts of the female copulatory organ (vulva) comprise a duct system, which can be divided into different sections. An initial duct (copulatory duct) leads from the copulatory opening to the spermatheca. It may be long, with several windings around the spermatheca (e.g. in species like *Cheiracanthium campestre* Lohmander, 1944, see Tullgren 1946, pl. VII, fig. 78, Almquist 2006, fig. 304e). From the spermatheca a narrow fertilisation duct leads to the uterus externus. The latter and parts of the fertilisation duct are inevitably removed along with the dissection and clearing of the copulatory organ. The receptaculum seminis (spermatheca) may be one single voluminous, often pear-shaped to elongated kidney bean-shaped chamber (Figs 8b, 9b) or there are two chambers connected with each other by a narrow duct (Figs 2b,d, 3c, 4b,d, 6b, 7c), which may build up a "compound spermatheca". In the latter case the initial (anterior) chamber contains an area with numerous pores, which permit connection to accessory glands. Apart from structures that are well known in arachnology, e.g. conductor, sperm duct and embolus, the palps of *Cheiracanthium* bear particular structures, e.g. a tegular apophysis (in some species with special structures), a (long) cymbial spur, etc. The terminology of these structures follows Lotz (2007a).

Symbols/styles used in the illustrations: Regular solid lines indicate surface edges/margins/rims of structures as recognised in the respective view; weak solid lines indicate edges of fine structures, e.g., membranous structures, or wrinkles in the area of the epigyne; dashed lines indicate inner walls of chambers, ducts (and/or slits); dotted lines (rough) indicate structures visible through cuticula (e.g., parts of vulva visible through epigynal cuticula); dotted lines (fine) indicate clear colour differences (e.g., border of epigynal field). In schematic illustrations showing the course of the internal duct system the area containing numerous pores is marked with a "T"-symbol, the copulatory opening with a circle and the end of the fertilisation duct in direction of the uterus externus with an arrow (Figs 2c, 6c, 8c). Arising points and/or directions of tegular appendages in males are described as clock-positions of the left palp in ventral view.

Museum collections (with curators) & private collections: BPC - Steffen Bayer, private Collection, Frankfurt am Main, Germany. MHNG - Muséum d'histoire naturelle, Geneva, Switzerland (P. Schwendinger). NHM - Natural History Museum, London, United Kingdom (J. Beccaloni). NHMNB - Naturhistorisches Museum, Nürnberg (Nuremberg), Germany (D. Cordes). NHMW - Naturhistorisches Museum Wien, Vienna, Austria (C. Hörweg). OUMNH - Oxford University Museum of Natural History, United Kingdom (Z. Simmons). SMF - Senckenberg Museum, Frankfurt am Main, Germany (P. Jäger). ZMB – Zoologisches Museum (Museum für Naturkunde), Berlin, Germany (J. Dunlop)

Taxonomy

Cheiracanthium furculatum Karsch, 1879 (Figs 1-4)
For the synonymic list see Platnick (2013)

Material examined (2♂, 4♀, 1 s.a.♀). Holotype ♂: GABON: Estuaire: Chinchoxo (today: Chinchoua), S 00°02', E 09°47'; Dr Julius Falkenstein leg. 1873-1876 ('Loango-Expedition der Deutsch-Afrikanischen Gesellschaft'), ZMB 2962. GERMANY: Rhineland-Palatinate: Landkreis Kaiserslautern: Spesbach, supermarket, N 49°25'51", E 07°30'46" (within a box of white grapes imported from Morocco [origin: Morocco: Meknès-Tafilalet: Surroundings of Meknès, approximately N 33°51'-33°57', W 05°23'-05°39',

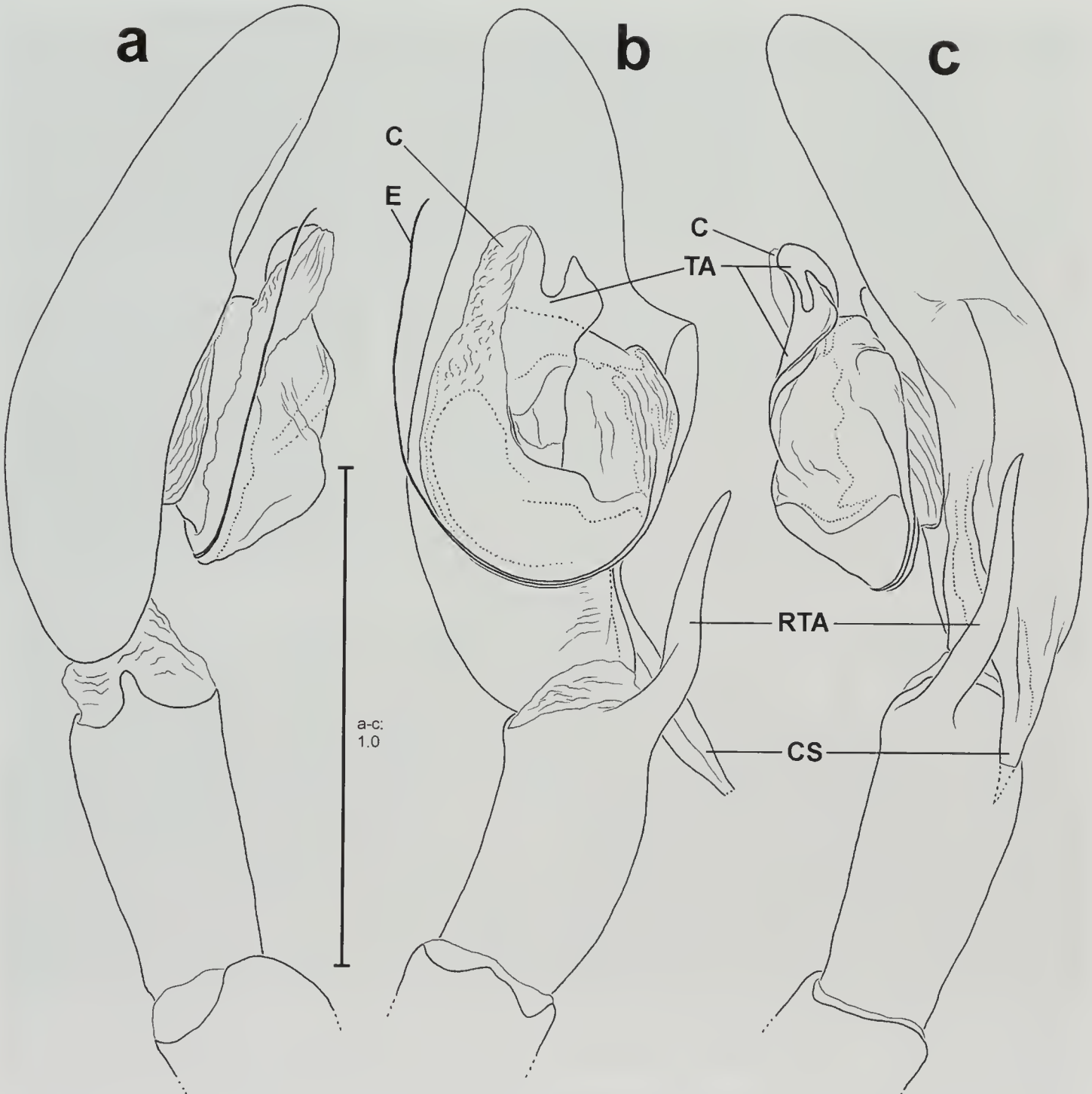

Fig. 1a-c: *Cheiracanthium furculatum*, male holotype from Gabon, Estuary. **a–c** Left palp. **a** – prolateral, **b** – ventral, **c** – retrolateral view. C: conductor, CS: cymbial spur, E: embolus, RTA: retrolateral tibial apophysis, TA: tegular apophysis.
Remark: (Pointed) tip of cymbial spur was found broken; in **c** it is indicated with a dotted line, inferred from the situation in the right palpus.

500-700 m]); R. Bayer & G. Bayer leg. 04.VII.2012, 1 ♀, SMF, 1 s.a. ♀ (raised from egg cocoon produced by female listed directly before), BPC. CAP VERDE ISLANDS: Boavista; G. Schmidt leg.; 1 ♀ (only vulva as microslide), SMF 58248. Maio; G. Schmidt leg. 01.III.1995; 1 ♀, SMF 38567, 1 ♂ SMF 38566. Brava; G. Schmidt leg.; 1 ♀ (only vulva as microslide), SMF 58289.

Diagnosis and Description. Lotz (2007a) treated this species in detail. However, he did not give the measurements of the male holotype, hence, these are added herein. Furthermore, the measurements of the female from Morocco are listed, as this record represents the northernmost record of this species.

Male (holotype): Body and eye measurements. Total length 7.8, carapace length 3.4, carapace width 2.5, anterior width of carapace 1.6, opisthosoma length 3.6, opisthosoma width 2.0, sternum length 1.4,

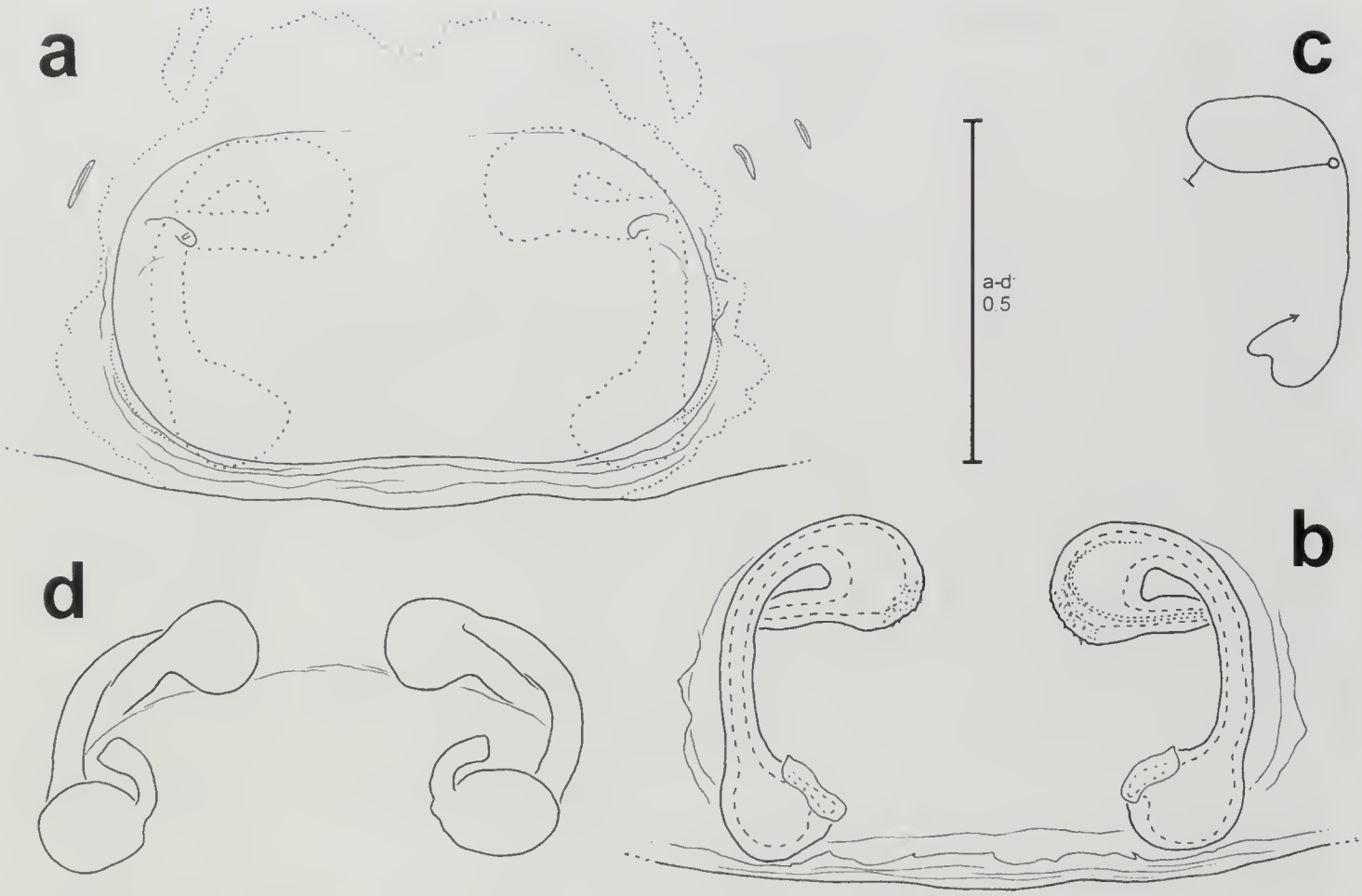

Fig. 2a-d: *Cheiracanthium furculatum*, copulatory organ of female from Germany, Rheinland-Pfalz (introduced from Morocco, Meknès-Tafilalet). **a** – Epigyne. **b** – Vulva. **c** – Schematic course of internal duct system. **d** – Vulva, postero-dorsal view. Dotted line (fine) in right vulva-half indicates a broken embolus stuck therein.

sternum width 1.5, ratio carapace length/carapace width 1.36, ratio total length of leg I/carapace length 6.29. Eyes: AME 0.19, ALE 0.16, PME 0.16, PLE 0.16, AME-AME 0.24, AME-ALE 0.17, PME-PME 0.31, PME-PLE 0.28, AME-PME 0.17, ALE-PLE 0.07, clypeus height at AME 0.06, clypeus height at ALE 0.10.

Cheliceral furrow with 2 very small promarginal and 3 retromarginal teeth.

Measurements of palp and legs. Leg formula: 1423. Palp 4.4 [1.7, 0.5, 0.7, 1.5 (without cymbial spur) 1.7 (with cymbial spur)], I 20.4 [5.0, 1.8, 5.5, 5.8, 2.3], II 14.1 [3.7, 1.5, 3.7, 4.0, 1.2], III 10.5 [2.8, 1.1, 2.3, 3.2, 1.1], IV 16.3 [4.0, 1.5, 3.6, 5.0, 1.2].

Spination. Palp: 0200, 0000, 0000, 0000; legs: femur I 2020, II 2010, III 4020{5030}, IV 3020; patella I-IV 0000; tibia I 00011, II 2005{2009}, III 2023, IV 2022{2023}; metatarsus I 0004, II 2004, III 3035{3036}, IV 30317{30319}.

Copulatory organ. Cymbium quite elongated (ca. 2.4x longer than broad), with pedestal-like extension retrolaterally (Figs 1b, 3e, 4e), retrolatero-proximal cymbium spur (which is a typical character for males of this genus) moderately long (slightly longer than half the length of palpal tibia without RTA) and pointed (Figs 1c, 3e, 4e); embolus very long and filiform (2-3x tegulum width), arising at 2-3 o' clock position on tegulum, running in a semi-circular course prolatero-distally (Figs 1b, 3e, 4e); conductor ca. 4x as long as broad, fleshy and arising centrally in prolateral half of tegulum; tegular apophysis with characteristic shape: relatively broad, arising centrally on tegulum, distally divided into two, relatively broad lobe-like extensions, with the prolateral slightly longer than the retrolateral one (Fig. 1b); sperm duct course hardly recognisable; palpal tibia (without RTA) ca. 2.5 times longer than broad (Figs 1a, 1c), RTA slightly longer than diameter of tegulum and slim, distally almost pointed (Figs 1b-c).

Female (adult specimen from Morocco): Body and eye measurements. Total length 10.4, carapace length 4.5, carapace width 3.2, anterior width of

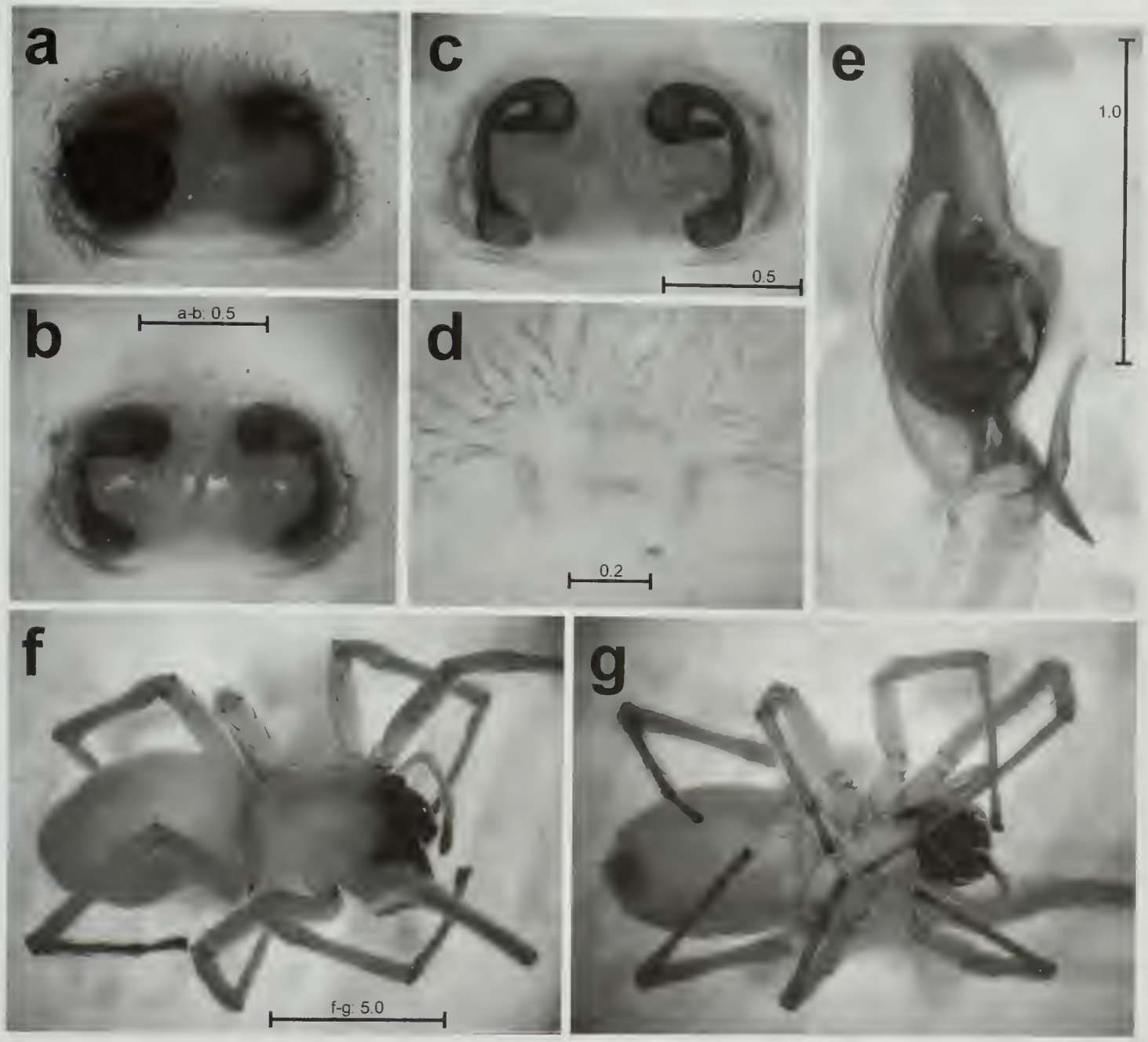

Fig. 3a-g: *Cheiracanthium furculatum*, photographic images of adult and primary copulatory organs and female habitus. **a-b** epigyne (**a** still with mating plug), **c** vulva, **f-g** habitus, all of female, **d** Pre-epigyne, of subadult female, both from Germany, Rheinland-Pfalz (introduced from Morocco, Meknès-Tafilalet). **e** Left palp, of male holotype from Gabon, Estuary.

carapace 2.2, opisthosoma length 5.8, opisthosoma width 4.0, sternum length 2.1, sternum width 1.7, ratio carapace length/carapace width 1.41, ratio total length of leg I/carapace length 3.87. Eyes: AME 0.25, ALE 0.26, PME 0.20, PLE 0.20, AME-AME 0.29, AME-ALE 0.31, PME-PME 0.41, PME-PLE 0.48, AME-PME 0.25, ALE-PLE 0.13, clypeus height at AME 0.13, clypeus height at ALE 0.12.

Cheliceral furrow with three promarginal (both very small) and two retromarginal teeth.

Measurements of palp and legs. Leg formula: 1423. Palp 4.9 [1.6, 0.6, 1.2, 1.5], I 17.4 [4.6, 1.9, 4.3, 4.8, 1.8], II 12.7 [3.5, 1.6, 3.0, 3.5, 1.1], III 9.7 [2.7, 1.3, 2.1, 2.7, 0.9], IV 14.6 [4.0, 1.6, 3.4, 4.5, 1.1].

Spination. Palp: 0500, 1200, 3100, 0000 (spines on all limbs of palp very small, less than 1/3 the length and width of those on the limbs of legs); legs: femur I 2000, II 2000, III 2020{3020}, IV 1010{2010}; patella I-IV 0000; tibia I 0002, II 0000, III 1010, IV 1010; metatarsus I 0003, II 0003, III 4044, IV 4045.

Copulatory organ. Epigyne with large-area, cross-oval (occasionally roughly kidney bean-shaped), very flat depression (Figs 2a, 3a-b, 4c), the margin of which posteriorly and laterally more distinctly developed

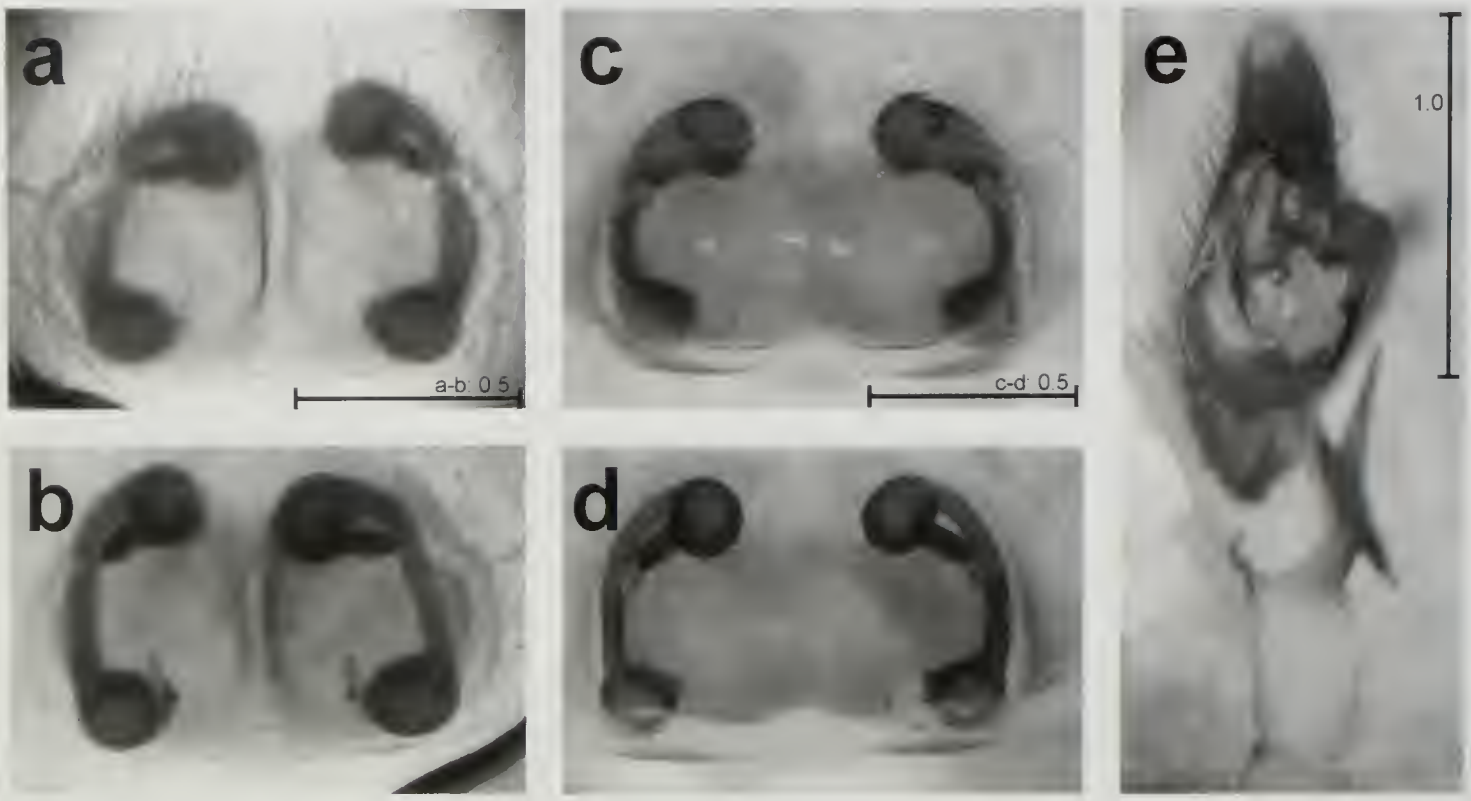

Fig. 4a-e: *Cheiracanthium furculatum*, photographic images of copulatory organs showing intraspecific variation. **a** Epigyne, **b** Vulva, both of female (SB 1278), **c-d** same of female (SB 1280). **e** Left palp, ventral view of male (SB 1281). All material from Cap Verde Isl.

than anteriorly (Fig. 2a); copulatory openings located anterio-laterally within that depression (Fig. 2a); epigynal field broader than long, anterior muscle sigilla elongated and located close to epigynal field (Fig. 2a). Vulva with short, transverse copulatory duct running from anterio-laterally to anterio-medial, leading into a first chamber with connection to associated glands (see area with pores medio-posteriorly on that chamber [Fig. 2b] which may be homologous to the spermathecal head in other groups of spiders); a long duct running posteriorly connects the first with another, posterior chamber (Figs 2b, 3c, 4b, d). In the female from Morocco in the right half of the vulva a broken embolus of a male reaches through the copulatory duct far into the first chamber (Figs 2b, 3c). An indistinct fertilisation duct arises medially on the second chamber of the receptaculum (Fig. 2b). Posterior view of the vulva (Fig. 2d) shows that the copulatory duct runs ventro-dorsally, with its initial section ventral to the connective duct between the two chambers. Fig. 2c shows the course of the rather simple internal duct system. In Fig. 3a the epigyne of this specimen is shown before preparation, still with a mating plug, which is almost round and covers a large area of the epigynal depression. The pre-epigyne of the subadult female (Fig. 3d) shows an inverted trapezoid, slightly sclerotised structure with two small, flat and indistinct depressions in the centre.

Colouration. See Lotz (2007a) for the male, colouration of female see Figs 3f-g.

Variation of male and female copulatory organs. Males: Shape of the tegular apophysis may differ slightly (Figs 1b, 3e cf. Fig. 4e cf. Lotz 2007a, fig. 39). In the holotype male (Figs 1b, 3e) the RTA (in relation to the cymbium length) is slightly shorter than in other specimens (Fig. 4e, Lotz 2007a, figs 39-40).

Females: Epigyne may consist of a very flat cross oval depression (Figs 2a, 3a-b, 4c), either without longitudinal ridge or with very indistinct one, or the depression is divided into two more or less round depressions by a distinct longitudinal ridge (Fig. 4a, Lotz 2007a, fig. 35). Length and orientation of copulatory ducts show differences (Fig. 3c cf. Fig. 4b cf. Fig. 4d), or partly distinct differences (Lotz 2007a, fig. 36, right half of vulva).

Distribution. Africa including Cape Verde- and Comoro-Islands (almost all records south of the Sahara, except one in Morocco), introduced into Belgium, Germany and probably Ireland.

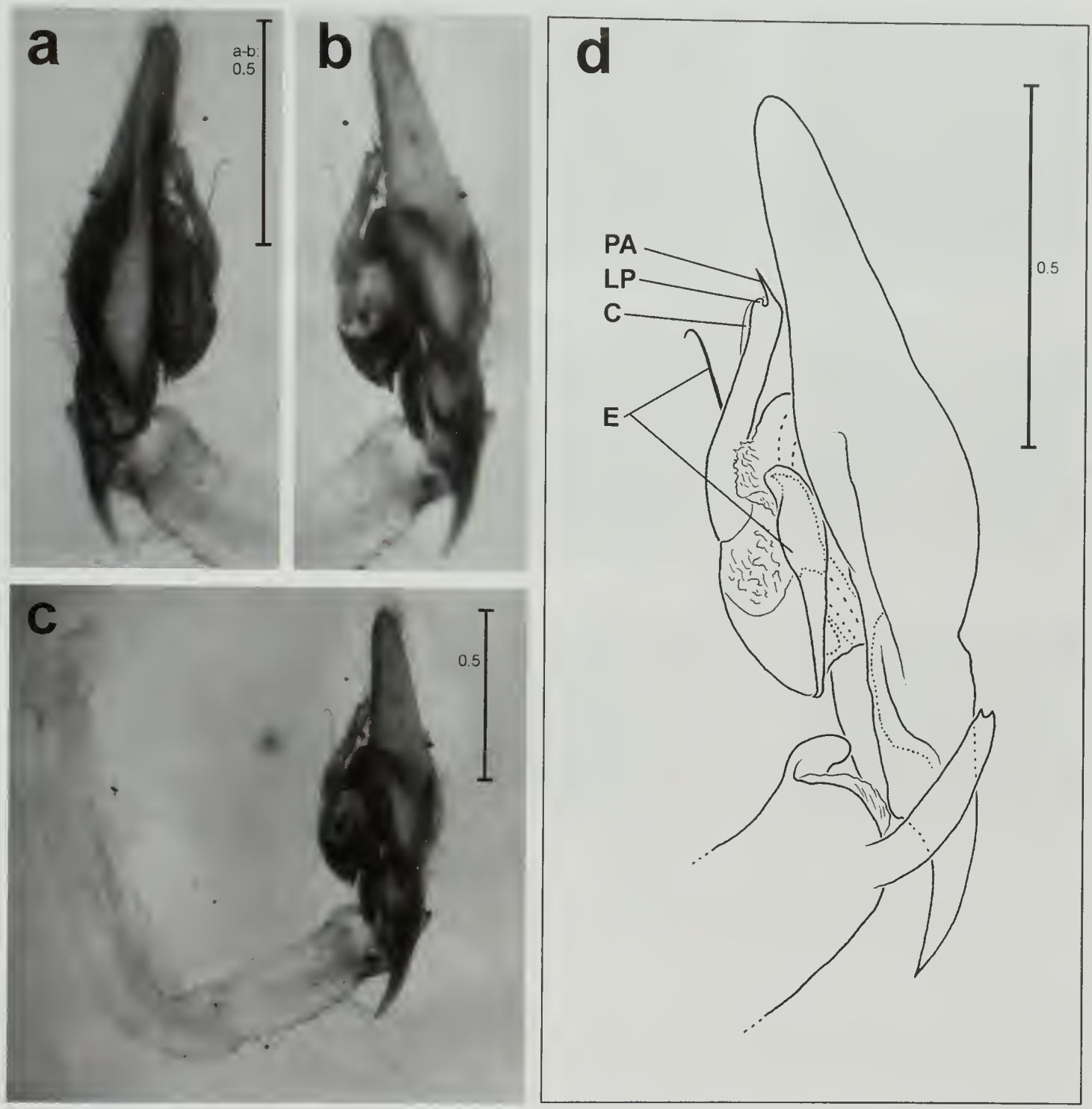

Fig. 5a-d: *Cheiracanthium africanum*, left palp (male holotype of *Cheiracanthium tenuipes* from Senegal, Niokolo-Koba-Park). **a** prolateral view. **b-d** retrolateral view (**b-c** different planes of focus). C: conductor, E: embolus, LP: lobus-like part of distal tegular apophysis, PA: pointed apex of distal tegular apophysis.

Cheiracanthium africanum Lessert, 1921 (Fig. 5)
Cheiracanthium africanum Lessert 1921: 411, figs 41-44 (descr. & illustr. ♂ & ♀). [Lectotype ♀ and one of the five paralectotypes, namely the only ♂, TANZANIA: Kibonoto: Kilimanjaro, S 03°12', E 37°07'; Bror Yngve Sjöstedt leg. 1905-1906 ('Kilimanjaro-Mission'); MHNG Cl 20, examined by Lotz 2007a (remaining four ♀ paralectotypes could not be traced by P. Schwendinger and also not by L. Lotz)]. For the complete synonymic list see Platnick (2013).

Cheiracanthium tenuipes Roewer 1961: 64, figs 21a-c (descr. & illustr. ♂). [Holotype ♂ left palpus as microslide; type locality: SENEGAL: Niokolo-Koba-Parc, Siminti, ex 'IFAN-Dakar'; collection Roewer; SMF 13255, examined]. **New synonymy**

Diagnosis and description. See Lotz (2007a) and Lessert (1921).

Additional descriptive remarks on the male copulatory organ. Cymbium quite elongated (at least 2.5x

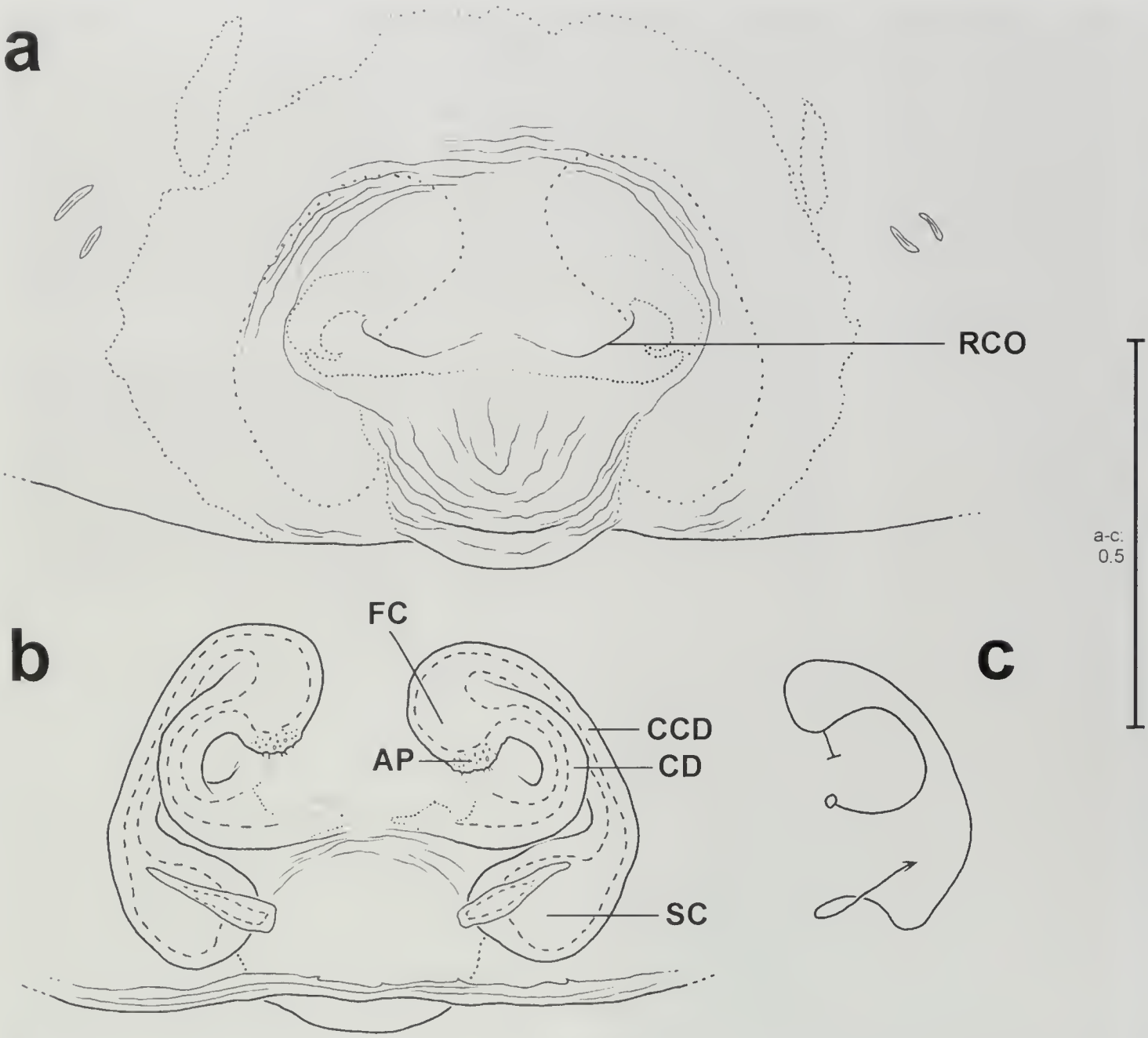

Fig. 6a-c: *Cheiracanthium mildei*, female from Germany, Rhineland-Palatinate. **a** Epigyne. **b** Vulva. **c** Schematic course of internal duct system. AP: area with many pores giving connection to accessory glands, CCD: Connective duct between the two chambers, CD: copulatory duct, FC: first chamber, RCO: rims of copulatory openings, SC: second chamber.

longer than broad) (Figs 5a-d), retrolatero-proximal cymbial spur (Figs 5c-d) moderately long (ca. half the length of palpal tibia without RTA) and pointed (Fig. 5c-d); embolus (Fig. 5a, d) quite long and filiform (ca. 2x tegulum width), arising in a 3 o'clock position on tegulum, running in a semicircular course prolatero-anteriorly; conductor ca. 3x as long as broad, fleshy and arising centrally in prolateral half of tegulum; tegular apophysis relatively slim, arising centrally on tegulum, distally bifurcated, one extension lobe-like, the other very narrow and pointed ("pointed apex" following Lotz 2007a) (Figs 5b-d); sperm duct course hardly recognisable; palpal tibia (without RTA) slightly more than 2 x longer than broad (Fig. 5c), RTA as long as the diameter of the palpal tibia, slim and distally with slight indentation (Fig. 5c-d).

Remarks. *Cheiracanthium tenuipes* was considered a nomen dubium by Lotz (2007a) with the supposition that it might be a synonym of *C. africanum*. In the present study it is explicitly recognised as junior synonym of *C. africanum* because the microslide with the fixed left male palp of the holotype clearly shows the diagnostic characters of *C. africanum* after Lotz (2007a). Especially the bipunctated distal tip

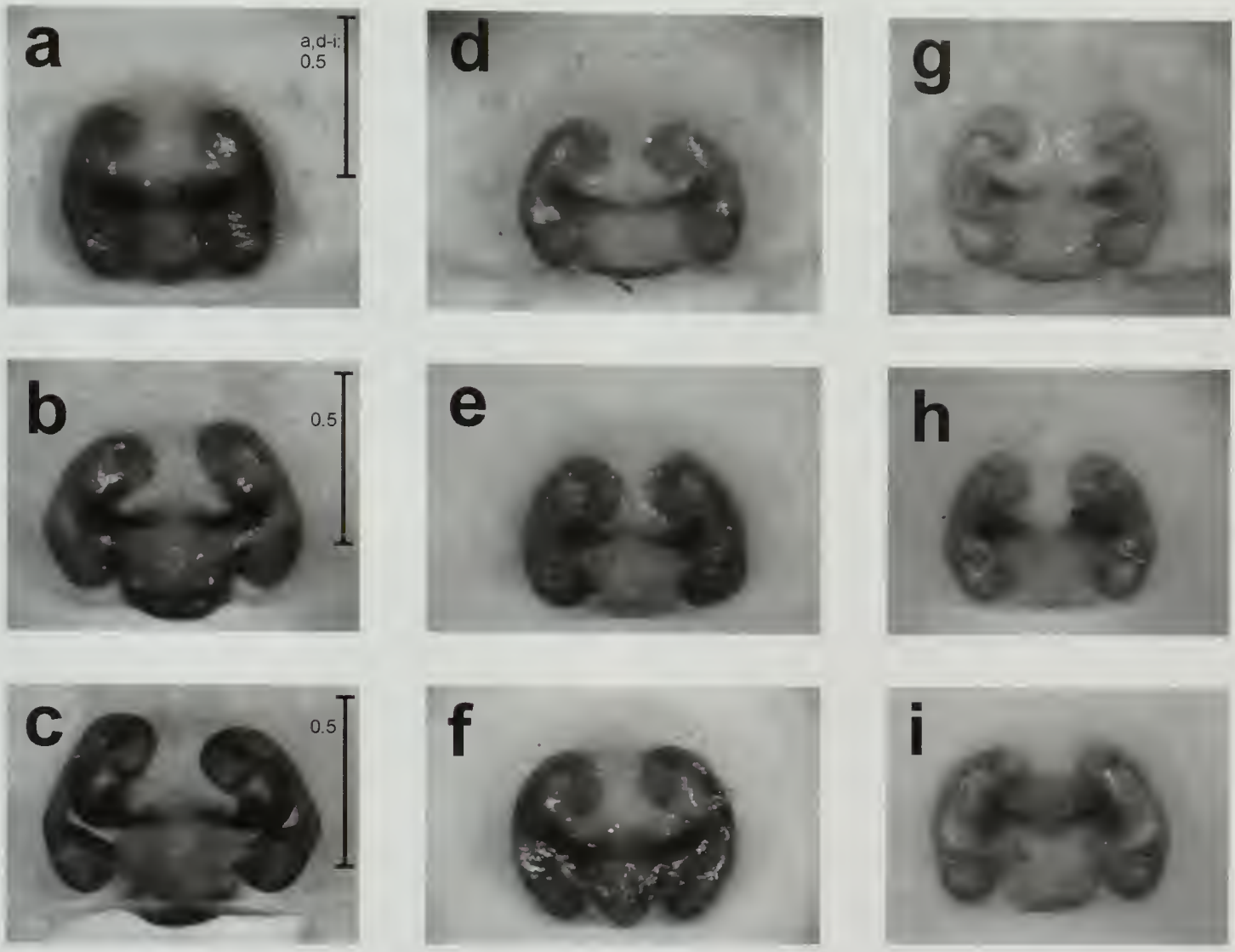

Fig. 7a-i: *Cheiracanthium mildei*, photographic images of female copulatory organs showing intraspecific variation. **a** Female (SB from Switzerland, Lago Maggiore. **b-c** Female from Germany, Rhineland-Palatinate. **d-e** Female holo- and paratype of *C. cretense* from Greece, Crete; unfortunately unknown which is which (see remarks in synonymic list of *C. mildei* under *C. cretense*). **f** Female from Germany, Bavaria. **g** Female holotype of *C. strasseni strasseni* from Israel, Rehovot-Tel-Aviv. **h-i** Female syntypes of *C. strasseni aharonii* from Israel, Tel-Aviv- Rehovot. **a-b, d-i** Epigyne. **c** Vulva.

of the RTA (accordingly the tip shows a small, flat and rather indistinct indentation, Fig. 5c-d) and the bilobed tegular apophysis with the prolateral pointed apex (Figs 5a-b, d) are clearly recognisable.

Cheiracanthium africanum is very similar to *C. inclusum* (Hentz, 1847). A synonymy of these two species was proposed by Ledoux (2004) but subsequently rejected by Lotz (2007a). Especially the males are extremely hard to discriminate from those of *C. inclusum*. The distinction of the males of these two species as given in Lotz (2007a) is based on the fact that the males of *C. inclusum* do not possess a bilobed tegular apophysis (with a long, slim and pointed prolateral part [pointed apex] and a broad, rounded retrolateral lobe-like part, as can be seen in *C. africanum*). However, at least in the illustrations of male palps of *C. inclusum* from America in Bonaldo & Brescovit (1992, figs 1-2) and Edwards (1958, figs 10-11) the tegular apophysis is bilobed and a pointed prolateral apex is present.

Distribution. Africa (south of the Sahara), Madagascar, Réunion.

Cheiracanthium mildei L. Koch, 1864 (Figs 6-7)

Cheiracanthium mildei Koch 1864: 342 (descr. ♂ & ♀) [Syntypes, 1 ♂, 1 ♀ ITALY: South Tyrol, Meran; Dr J. Milde leg.; originally in NHMNB, but no longer there (Cordes pers. comm.), later transferred to NHMW, acquisition date 1882, no. I.335 (Hörweg pers. comm.); further syntype material with unknown number of specimens from Croatia: Dalmatia, deposition unknown, possibly NHM (response of curator

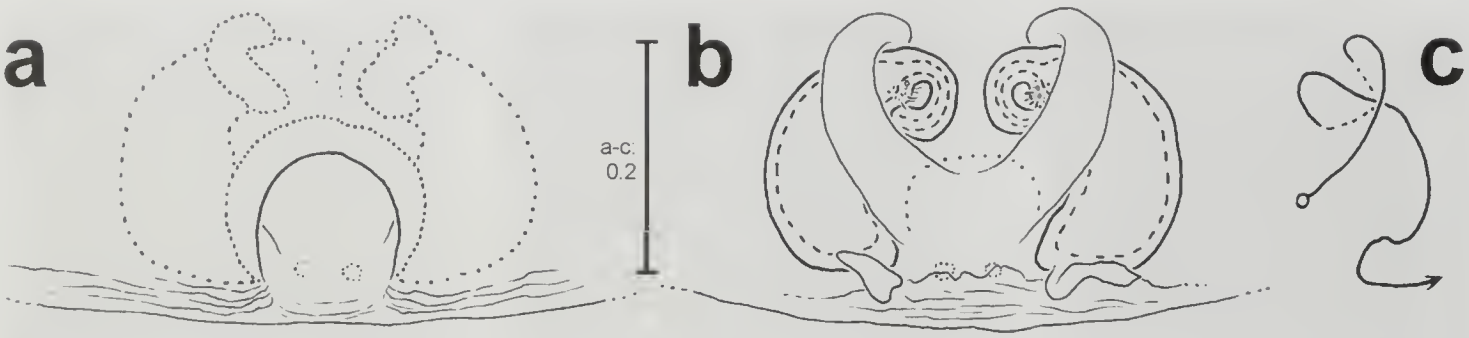

Fig. 8a-c: *Cheiracanthium rehobothense*, female holotype from Israel, Tel-Aviv-Rehovot. **a** Epigyne. **b** Vulva. **c** Schematic course of internal duct system.

J. Beccaloni to date missing) but definitely not OUMNH (Simmons pers. comm.); type material not examined, species identity is clear]. For the complete synonymy list see Platnick (2013).

Cheiracanthium strasseni strasseni Strand 1915: 156 (descr. ♀). [holotype ♀ ISRAEL: Rehoboth - Jaffa (between Rehovot and Tel Aviv); J. Aharoni leg. 26.IV.1913; SMF 4493, examined]. **New synonymy**

Cheiracanthium strasseni aharonii Strand 1915: 157 (descr. ♀). [2 ♀ syntypes (one of which with mating plug) ISRAEL: Jaffa - Rehoboth (between Tel Aviv and Rehovot); J. Aharoni leg. 1913; SMF 4494, examined]. **New synonymy**

Cheiracanthium cretense Roewer 1928: 116, pl. 1, fig. 22 (descr. & illustr. ♀). [holotype ♀ (sub 'Typus') and paratype ♀ (sub 'Co-Typus') GREECE: Crete: Chania: Environments of Chania, ca. N 35°30', E 24°00' (holotype), Akrotiri: Governeto monastery, ca. N 35°35', E 24°05' (paratype); unfortunately both specimens were put in the same vial, so it is impossible to tell which is which; C.-F. Roewer leg. 1926, collection Roewer RII/740/33, R. Bosmans det. *C. mildei*; SMF 9900740, examined]. Bosmans et al. 2013: 8 (synonymy).

Additional material examined (3 ♀). GERMANY: Rhineland-Palatinate: Landkreis Mainz-Bingen: Heidesheim, on a house wall, N 49°59'34", E 08°06'47", 105 m; S. Bayer leg. 01.V.2012, 1 ♀, BPC. Bavaria: Lindau, harbour facility, at handrail, N 47°32'34", E 09°40'59", 396 m; S. Bayer leg. 07.VI.2013, 1 ♀, BPC. SWITZERLAND: Ticino: Ascona, Lago Maggiore; collection Roewer RII/13395; 1 ♀, SMF 60687.

Diagnosis and description. See Koch (1864), Simon (1932), Sterghiu (1985), Dondale & Redner (1982).

Variation of female copulatory organ. Comparing Figs 7a, b, f with Figs 7d, g-i the colour of the posterio-median section of the epigyne partly differs clearly, but this may be due to preservation differences as several examples examined here are old museum specimens. The posteriormost median section of the epigyne may be narrow (Figs 7a, f) or rather broad with a relatively even posterior margin (Figs 7d, g, i). The roughly transversely orientated rims of the copulatory openings may be almost in contact with each other so that a long transverse edge is visible in the epigyne (Figs 7b, d, f) or they are clearly apart from each other (Figs 7a, g). The orientation of the lateral sections of the copulatory ducts may differ clearly (Figs 6a-c & 7b-e, h cf. Figs 7a, f, g).

Remarks. The two subspecies of *Cheiracanthium strasseni*, namely *C. strasseni strasseni* Strand, 1915 (nominotypical taxon) and *C. strasseni aharonii* Strand, 1915 are both synonymised with *C. mildei* because the copulatory organs of the female type specimens clearly show specific conformity with those of *C. mildei* (Figs 7g-i cf. Figs 6a-b, 7a-f). Strand (1915) delimited *C. strasseni* (both subspecies) from *C. mildei* by a septum that divides the epigynal pit. It is difficult to deduce what Strand meant with "septum". In fact the two roughly transversely orientated rims of the copulatory openings may be almost connected with each other or there is some space between them (which Strand possibly regarded as elongated septum). However, this is a matter of intraspecific variation (see above).

Cheiracanthium cretense was synonymised with *C. mildei* by Bosmans et al. (2013). Photographic images of the types of *C. cretense* are here shown (Figs 7d, e).

Distribution. This species has expanded its distribution area from Southern to Central Europe within the last decades/century (Muster et al. 2008, Wunderlich 2012). While formerly only known from the Mediterranean Palaearctic and Southern European region and not Central Europe (Simon 1932, Reimoser 1937) it is now known from most countries in Central Europe (Nentwig et al. 2013). Helsdingen (1979) did not list this species for the Netherlands, but as it was recorded in Belgium (Van Keer et al. 2007), Germany (e.g. Jäger 2000) and Austria (e.g. Thaler 2005) it is not unlikely that it will be found

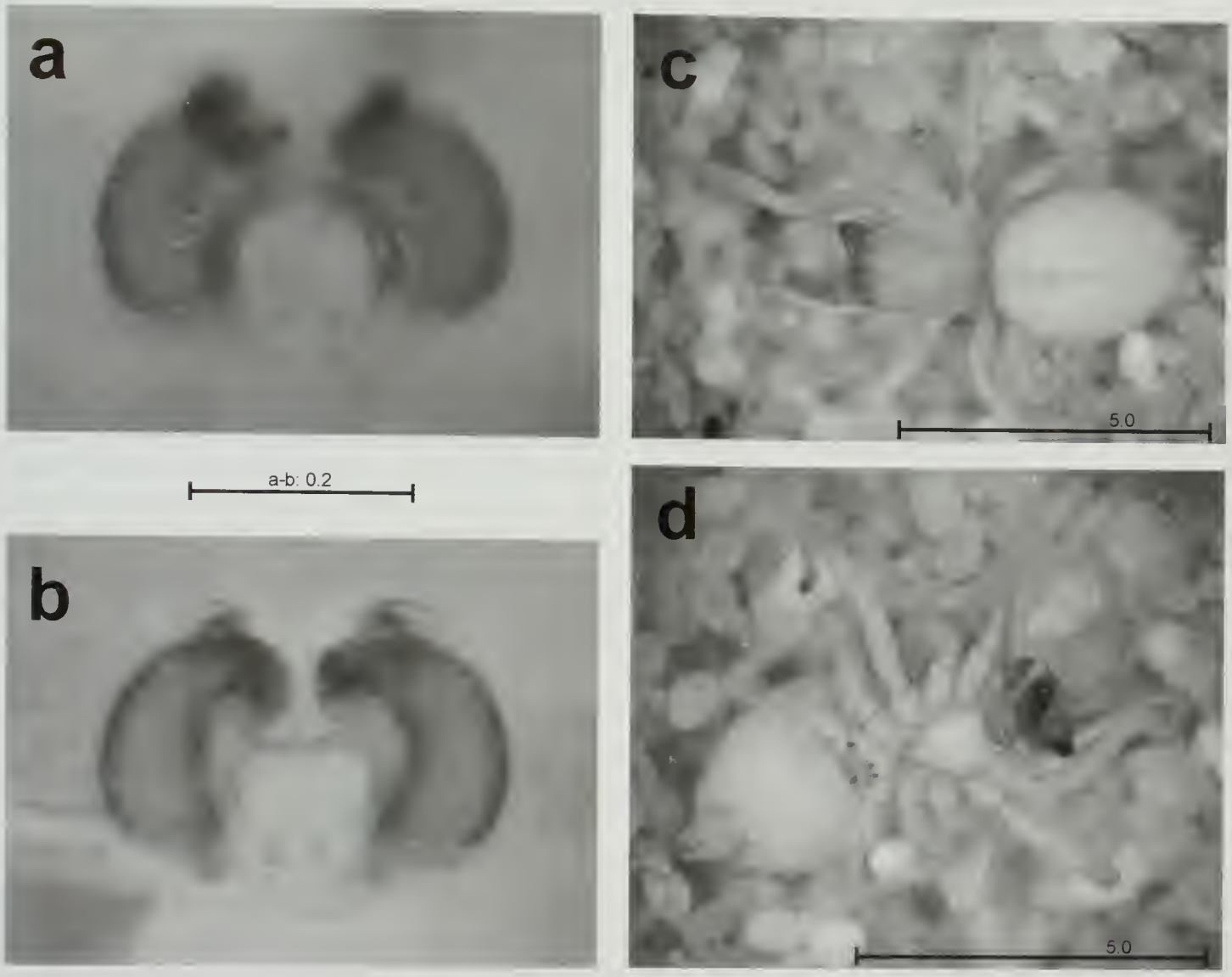

Fig. 9a-d: *Cheiracanthium rehobothense*, female holotype from Israel, Tel-Aviv-Rehovot, photographic images of copulatory organ and habitus. **a** Epigyne. **b** Vulva. **c-d** Female, habitus, **c** dorsal, **g** ventral view.

in the Netherlands too. Even though in Central Europe it is mostly found synanthropically, it cannot be excluded that, in the course of climate change, it may be found far away from human settlements too. *C. mildei* was introduced into North and South America and is now established there (Edwards 1958, Bonaldo & Brescovit 1992, Dondale & Redner 1982, Paquin & Dupérré 2003).

Cheiracanthium rehobothense Strand, 1915
(Figs 8-9)

Cheiracanthium rehobothense Strand 1915: 158 (descr. ♀). [Holotype ♀ ISRAEL: Jaffa - Rehoboth (between Tel Aviv and Rehovot); J. Aharoni leg. 14.VII.1913; SMF 4490, examined].

Additional material examined (1 s.a. ♂). ISRAEL. Jaffa - Rehoboth; J. Aharoni leg. 14.VII.1913, E. Strand det. with denotation "likely belonging to this species"; 1 s.a. ♂, SMF 4491.

Remark. Strand (1915) also examined an adult male that he also found likely to belong to this species (SMF 4492). This specimen must have become lost, as in the SMF collection only the empty vial exists with a label saying "type" and a corresponding index card saying "vial was found empty, checked 1967". However, neither this male nor the subadult male listed above can be considered types of *C. rehobothense*, as Strand (1915) expressed some doubts about their species affiliation in saying "[these two specimens] likely belong to this species" [ICZN § 72.4.1].

Diagnosis. Females of *Cheiracanthium rehobothense* are distinguished from those of all other *Cheiracanthium* species by the following characters in combination:

Small species (body length female: 5.5 mm) with small epigyne (width ca. 0.4 mm); central epigynal pit consistently semicircular (Figs 8a, 9a); initial section of copulatory duct with steep (latero-) anterior course (Figs 8b-c); copulatory duct with less than one winding around anterior section of elongated kidney bean-shaped receptaculum, and medially with a semicircular curve until reaching the latter (Fig. 8b).

Presently, it is impossible to give a diagnosis for males. Strand (1915) examined a male, which is now lost (see above) and which he did not unambiguously assign to this species. Based only on the description in Strand (1915) it is not possible to clearly characterise and distinguish the male from those of similar species.

Description

Female (holotype): Body and eye measurements. Total length 5.5, carapace length 2.2, carapace width 1.6, anterior width of carapace 1.3, opisthosoma length 3.1, opisthosoma width 2.4, sternum length 1.1, sternum width 1.0, ratio carapace length/carapace width 1.375, ratio total length of leg I/carapace length 4.00. Eyes: AME 0.12, ALE 0.12, PME 0.115, PLE 0.115, AME-AME 0.15, AME-ALE 0.14, PME-PME 0.21, PME-PLE 0.22, AME-PME 0.125, ALE-PLE 0.06, clypeus height at AME 0.08, clypeus height at ALE 0.07.

Cheliceral furrow with six promarginal (both very small) and six retromarginal teeth.

Measurements of palp and legs. Leg formula: 1423. Palp 2.5 [0.8, 0.35 0.5, 0.85], I 8.8 [2.3, 0.9, 2.1, 2.3, 1.2], II 5.5 [1.5, 0.7, 1.3, 1.35, 0.65], III 4.4 [1.3, 0.6, 0.8, 1.1, 0.65], IV 6.3 [1.8, 0.65, 1.5, 1.7, 0.65].

Spination. Palp: 0000, 0000, 0000, 0000; legs: femur I 1000, II-IV 0000; patella I-IV 0000; tibia I 0002, II 0000, III 1010, IV 1010; metatarsus I 0003, II 0003, III 2025{4034}, IV 4034.

Copulatory organ. Epigyne generally of the type of the common and well-known species *Cheiracanthium erraticum* (Walckenaer, 1802): a roughly semi-circular epigynal pit with more or less distinctly sclerotised margin; vulva: copulatory ducts at least slightly wound around receptacula and generally visible through cuticle. The vulva of *C. rehobothense* shows a copulatory duct with less than one winding around receptaculum; initial section of copulatory duct almost hyaline and its central part slightly more than half as broad as central part of receptaculum (Fig. 9b); distance between the anterior-medial semi-circular sections of each copulatory duct (before meeting receptacula) slightly less than diameter of one duct (Figs 8b, 9b); fertilisation ducts indistinct, arising posterior to posterior-medial on receptacula (Fig. 8b); two yellowish-brown spots recognisable in the epigynal pit, clearly posterior to the copulatory openings (Figs 8a, 9a-b).

Colouration. Carapace light with light-brown to yellow colour; chelicerae brown; sternum and legs with the same colour as carapace but even lighter (Fig. 9d); opisthosoma very light with beige colour, dorsally with a very long and narrow yellowish medial lanceolate band which may be interrupted several times towards posterior end of opisthosoma (Fig. 9c). Even though the specimen is slightly faded in EtOH the detailed description by Strand (1915) is still applicable.

Remarks. According to the similarity of the copulatory organ of *Cheiracanthium rehobothense* to those of the following species it seems possible that these species are the closest relatives: *C. gratum* Kulczyński, 1897, *C. pelasgicum* (C. L. Koch, 1837), *C. montanum* L. Koch, 1877 and *C. pennatum* Simon, 1878. According to the structure of the female copulatory organ *C. gratum* is most similar. Merkens & Wunderlich (2000) removed *C. gratum* from the synonymy with *Cheiracanthium angulitarse* Simon, 1878 and first described and illustrated the female of *C. gratum*. The latter also has a copulatory duct with less than one complete winding around the distal part of the receptaculum. However, the curve of the distal-most section of the copulatory duct (before meeting the receptaculum) is orientated in the opposite direction. Based on Simon (1932) and Hansen (1991) the female copulatory organ of *C. angulitarse* is clearly different from *C. gratum* and *C. rehobothense* as well. According to Simon (1932) and Sterghiu (1985) the epigyne and the vulva of *C. pelasgicum* are quite similar to *C. rehobothense*, however, in *C. pelasgicum* the epigynal pit is not as evenly semicircular and its strongly sclerotised margin is distinctly broader than in *C. rehobothense*. The illustrations in Sterghiu (1985) and Dimitrov (1999) show the initial section of the copulatory duct of *C. pelasgicum* also running quite steep, but the distal section with a different course. According to the general appearance of the copulatory organ (Reimoser 1937, Heimer & Nentwig 1991,

Roberts 1998) *C. montanum* is also similar to *C. rehobothense*, however there are clear differences in the course of the distal half of the copulatory duct (Fig. 8b cf. Reimoser 1937, fig. 51 [ventral view], Sterghiu 1985, fig. 35c and Roberts 1998, p. 142, fig. at lower left corner, all showing the vulva of *C. montanum*). Pesarini (1997) gave a detailed illustration of the male copulatory organ of *C. montanum* in retrolateral view. It seems highly likely that he mixed the figure numbers. Pesarini's (1997) fig. 3 actually shows *C. montanum*, his fig. 4 shows *C. elegans* Thorell, 1875. Since its first description, *C. pennatum* was only treated and illustrated three times (Simon 1932, Sterghiu 1985, Urones 1988). The illustrations of the male in Sterghiu (1985) and male and female in Urones (1988) are difficult to interpret and it is possible that they are based on misidentifications. They are reminiscent of *C. pennyi* O. Pickard-Cambridge, 1873. The illustration of the female epigyne of *C. pennatum* in Simon (1932) resembles that of *C. rehobothense*, but the anterior sections of the copulatory ducts that shine through the cuticle are not as compact and curved as in the latter species. Simon (1878, 1932) did not provide illustrations of the vulva, so it is now difficult to delimit *C. pennatum* from *C. rehobothense* according to the course of the copulatory duct. The epigyne of *C. erraticum* may somewhat resemble that of *C. rehobothense*, however, the course of the copulatory duct is clearly different and shows more than one winding around the receptaculum.

Even though colouration is a character with far less taxonomical priority it may be briefly discussed here too. *C. pennatum, C. montanum* and *C. erraticum* have colouration patterns different from that of *C. rehobothense*. They show a relatively broad and distinct red to red-brown median band, with its posterior section often in form of many stacked broad chevrons. *C. pelasgicum* resembles more *C. rehobothense* concerning the colouration as it is rather uniformly and relatively pale coloured, without a broad red to red-brown band dorsally on the opisthosoma, but instead just a narrow lanceolate band (Sterghiu 1985). *C. gratum* (Merkens & Wunderlich 2000, p. 43) resembles *C. rehobothense* mostly in having a similar colouration like *C. pelasgicum*, albeit in general even lighter.

Distribution. At the moment only known from the type locality (between Tel-Aviv and Rehovot) in Israel.

Discussion

Some species mentioned and treated herein are concerned by taxonomical transactions from Wunderlich (2012), who resurrected the genus *Chiracanthops* Mello-Leitão, 1942. He justified his decision by proposing several diagnostic characters. In this context he transferred *Cheiracanthium mildei* and *C. inclusum* (Hentz, 1847) to *Chiracanthops*. Platnick (2013) did not follow this decision and still regarded *Chiracanthops* as a junior synonym of *Cheiracanthium* C. L. Koch, 1839. Wunderlich's (2012) concept seems comprehensible and indeed seems applicable to most of the African and European *Cheiracanthium* species. Following this concept, three of the focal species treated herein would belong to *Chiracanthops*, namely *C. furculatum*, *C. africanum* and *C. mildei*, while *C. rehobothense* would remain in *Cheiracanthium*. However, the genus *Cheiracanthium* is very diverse and up to now more than 180 valid species have been described. Before splitting such a genus, all current species should be considered, which certainly requires a large-scale study (i.e. a worldwide phylogenetic revision). At least a few African species show some diagnostic characters of *Cheiracanthium* sensu stricto and some of *Chiracanthops* (after Wunderlich 2012) which makes it impossible to assign them correctly (e.g. *C. leucophaeum* Simon, 1897 and *C. minshullae* Lotz, 2007). Consequently, the present study follows Platnick (2013) in regarding *Chiracanthops* as a junior synonym of *Cheiracanthium*.

A comprehensive revision of the Afrotropical *Cheiracanthium* species was presented by Lotz (2007a, 2007b). The present study is partly based on the findings of this publication. Following Lotz (2007a), *C. furculatum* is widely distributed and common in Africa and often appears synanthropic. This may explain the introductions to Central Europe with fruit imports from Africa. It is unlikely that this species, which is adapted to tropical and subtropical climates, will establish stable populations in Central Europe; at least not outside of human buildings. It remains to be seen if in the future further introduction events of *C. furculatum* in Central Europe will be revealed.

Up to now no revisions *sensu stricto* have been published for the *Cheiracanthium* species of Europe, Mediterranean Africa and the Near East. Several studies introducing the *Cheiracanthium* fauna of certain regions or countries of Europe have been presented, e.g. Simon (1932), Sterghiu (1985), Heimer & Nentwig (1991), Roberts (1998), Almquist (2006).

For the countries bordering the Mediterranean Sea from the East and the South and for several countries of South-Eastern Europe knowledge of the genus *Cheiracanthium* is markedly poor. Currently, 41 *Cheiracanthium* species have been described from Europe, Mediterranean Africa and the Near East with several groups of very similar species. At least 10 of these 41 species (*C. abbreviatum* Simon, 1878, *C. annulipes* O. Pickard-Cambridge, 1872, *C. auenati* Caporiacco, 1936, *C. barbarum* (Lucas, 1846), *C. cuniculum* Herman, 1879, *C. exilipes* (Lucas, 1846), *C. festae* Pavesi, 1895, *C. fulvotestaceum* Simon, 1878, *C. jovium* Denis, 1947, *C. macedonicum* Drensky, 1921) are currently poorly characterised and thus difficult to identify. According to their type localities it is possible that the following species are related to *C. rehobothense* (or even conspecific?): In *C. auenati* and *C. cuniculum* the illustrations of the copulatory organs in Caporiacco (1936) and Herman (1879) are small and simplified and thus difficult to interpret. Lucas (1846) and Pavesi (1895) did not even provide illustrations of copulatory organs for *C. barbarum*, *C. exilipes* and *C. festae*, respectively. For the following species it is unlikely or even impossible that they are related to *C. rehobothense*: *C. jovium* as illustrated in Denis (1947) appears very likely to be a synonym of *C. furculatum* and *C. macedonicum* might be a synonym of *C. mildei*, based on the illustration in Drensky (1921) and the fact, that the latter is widely distributed and common in the Balkan region. The illustration of the epigyne of the Israeli species *C. annulipes* in Pickard-Cambridge (1872) looks clearly different from that of *C. rehobothense*. By checking the type material of the species mentioned above and ideally a lot of material from each species it would be possible to learn (more) about intraspecific variation and thus to give a clear characterisation of these species.

Hence, a revision of *Cheiracanthium* for Europe, Mediterranean Africa and the Near East including a thorough examination and re-description of the type material of all described species (valid species and synonyms) is urgently necessary.

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Mesothele spiders in the Museum für Naturkunde Berlin

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Abstract. An annotated catalogue of the rare mesothele spiders (Araneae: Mesothelae: Liphistiidae) held in the Museum für Naturkunde Berlin is presented. The museum hosts non-type specimens of nine species representing all three currently recognised genera, namely: *Liphistius desultor* Schiödte, 1849, *L. malayanus cameroni* Haupt, 1983, *L.* cf. *thaleban* Schwendinger, 1990, *Heptathela kikuyai* Ono, 1998, *H. kimurai* (Kishida, 1920), *H. yanbaruensis* Haupt, 1983, *Ryuthela ishigakiensis* Haupt, 1983, *R. nishihirai* (Haupt, 1979) and *R. tanikawai* Ono, 1997 (**spec. reval.**). The geographical focus of this collection is Malaysia and Japan, and most of the material was collected by the Berlin-based zoologist Joachim Haupt.

Keywords: Araneae, Asia, Joachim Haupt, Liphistiidae, Mesothelae, ZMB

Zusammenfassung: Gliederspinnen im Museum für Naturkunde Berlin. Ein kommentierter Katalog der im Museum für Naturkunde Berlin deponierten seltenen Gliederspinnen (Araneae: Mesothelae: Liphistiidae) wird präsentiert. Das Museum beherbergt neun Arten (keine Typen) aus allen drei zurzeit anerkannten Gattungen: *Liphistius desultor* Schiödte, 1849, *L. malayanus cameroni* Haupt, 1983, *L.* cf. *thaleban* Schwendinger, 1990, *Heptathela kikuyai* Ono, 1998, *H. kimurai* (Kishida, 1920), *H. yanbaruensis* Haupt, 1983, *Ryuthela ishigakiensis* Haupt, 1983, *R. nishihirai* (Haupt, 1979), *R. tanikawai* Ono, 1997 (**spec. reval.**). Der geografische Schwerpunkt der Sammlung liegt in Malaysia und Japan, wobei der Großteil des Materials von dem Berliner Zoologen Joachim Haupt gesammelt wurde.

Mesothelae is a fairly small suborder of spiders (currently 87 species in three genera, Platnick 2014) which are nevertheless of considerable phylogenetic interest. On first appearance they resemble mygalomorph spiders ("tarantulas", etc.), but in fact they are widely accepted as the most basal spider lineage retaining plesiomorphic characters such as a segmented opisthosoma bearing spinnerets near the middle of the underside. The latter character is the source of the name 'meso' – 'thelae'. All other spiders have their spinnerets located at or close to the rear of the opisthosoma and are grouped in the suborder Opisthothelae. Fossil data indicate that mesotheles – or at least similar-looking spiders with a segmented opisthosoma and similar carapace and eye morphology – were found across Euramerica during the late Carboniferous. For a recent account of new fossils, which also drew on the material documented here for comparative purposes, see Selden et al. (in press). Today the group is restricted to eastern Asia (see below).

Living mesotheles are medium to large-sized spiders which construct a burrow covered by one or two trap-doors. Up to ten silken 'trip-wires' radiate from the burrow entrance. The spider lurks inside the burrow and is alerted to prey touching the silk threads which effectively act as a sort of 'proto-web'. A detailed account of mesothele anatomy and biology can be found in Haupt (2003).

The Museum für Naturkunde in Berlin (MfN) hosts a small, but significant collection of these quite rarely collected spiders. As the first of a planned series of papers documenting the spider collections of this museum – particularly groups not covered previously by the Berlin type catalogues by Manfred Moritz and Sophie-Charlotte Fischer (e.g. Moritz & Fischer 1990, Moritz 1992) – we present an annotated catalogue of the Mesothelae holdings.

Much of the mesothele material of the MfN was assembled by the Berlin-based zoologist Joachim Haupt (Fig. 1), formerly of the Free-University Berlin and later of the city's Technical University, who died in April 2013. As well as studying arthropod groups such as myriapods, mites, hexathelid spiders and whip scorpions – with a particular

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Dedicated to the memory of Joachim Haupt who died in April 2013.

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focus on micro-morphology and ultrastructure – Joachim Haupt worked extensively on the biology and systematics of mesothele spiders (Haupt 1977, 1979, 1981, 1982, 1983, 1984, 1986, 1990, 1993, 2002, 2003, Haupt & Traue 1986, Haupt & Kovoor 1993). He also had strong links to Japan, where he often collected as can be seen from the specimen labels and associated dates. We dedicate this present work to his memory. It should be noted that – contrary to published data – the types of his new species were not deposited in the MfN (formerly in East Berlin), having been described at the time when Berlin was still a divided city. Other spider specimens collected by Joachim Haupt can be found in the Zoological Museum of the University of Hamburg and in the zoological collections of the University of Rostock (both Germany), but the precise wherabouts of some type material remains equivocal. See below for notes on individual species.

Material and methods

All specimens listed here are stored in the wet collections (in 70 % alcohol) and have all been given ZMB (for Zoologisches Museum Berlin) repository numbers, which is the traditional acronym for the MfN. The data will be added to the database Systax. Some changes in nomenclature proved necessary to reflect the recognition of certain subspecies as distinct species in more recent publications. Individual case studies are discussed below and the specimen labels are amended accordingly. During the course of this work we also realised that a number of locality names were either incorrect or had at least been wrongly transcribed from the original labels. These have all been corrected here.

Results

Order **Araneae** Clerck, 1757
Suborder **Mesothelae** Pocock, 1892
Family **Liphistiidae** Thorell, 1869
Subfamily **Liphistiinae** Thorell, 1869
Remarks: According to authors such as Schwendinger & Ono (2011, and references therein), living mesotheles can be divided into two subfamilies: the South-East Asian Liphistiinae and the East Asian Heptathelinae. The latter subfamily was considered in some schemes – particularly Haupt (1983) – to be a distinct family, Heptathelidae, but see Raven (1985) for counterarguments.

Fig. 1: Joachim Haupt (died 2013), photographed in 2008. He collected much of the mesothele material held in the Museum für Naturkunde in Berlin (MfN) and worked extensively on these spiders. Image courtesy of the European Society of Arachnology (http://www.european-arachnology.org/).

Liphistius Schiödte, 1849
Liphistius desultor Schiödte, 1849 (Fig. 2a)
Material: ZMB 10074, 1♀; "Pulu Pinang" [Penang Island], Peninsular MALAYSIA; date uncertain, "Kauf Roesen 27.3.47" [purchased from Roesen]. ZMB 48315, "Falltür" [trapdoor]; Teluk Bahang, Penang Island, Peninsular MALAYSIA, leg. J. Haupt, 2.III.1981.
Remarks: This species – the first mesothele to be described (Schiödte 1849) – is restricted to Peninsular Malaysia. There is no further data about whom ZMB 10074 was purchased from. The locality is, in both cases, most likely Penang Island since the literal translation of the locality of the label is "areca palm island" (Schwendinger pers. comm.). This species was also reported from the nearby mainland (Platnick et al. 1997).

Liphistius malayanus cameroni Haupt, 1983
Material: ZMB 48532, 2 juv.; "Berinchan" [Brinchang or Berincang, Peninsular MALAYSIA]; leg. Haupt, 16.IV.1984.

Remarks: Also endemic to Peninsular Malaysia; as its name implies, this subspecies occurs in the Cameron Highlands. The holo- and paratypes of this species were explicitly noted as having been deposited in the Zoologisches Museum Hamburg (see Haupt 1983: 282), and as having been collected in 1981. Both specimens in Berlin are also from the type locality, but both are juveniles and since they postdate the original description, they cannot be part of the type series.

Liphistius* cf. *thaleban Schwendinger, 1990
Material: ZMB 48313, 1 f, m, juv.; Thaleban National Park (near Satun), southern THAILAND, leg. V. Šejna, X.1998; partly disarticulated, probably dried at one stage.
Remarks: The collector is Vladimír Šejna (Czech Republic), who has collected numerous arachnids in the that area of Thailand; see e.g. Kovařík (2004) for scorpions.

Subfamily **Heptathelinae** Kishida, 1923
Remarks: Kishida (1923) established this group as a tribe (Heptatheleae) within the subfamily Liphistiinae (cf. Bonnet 1957: 2158).

Genus ***Heptathela*** Kishida, 1923
Remarks: In his 1983 paper, Joachim Haupt regarded all *Heptathela* from Kyushu to Okinawa as part of a single species – a concept reflected in the original MfN labels – albeit recognising several subspecies: *H. kimurai kimurai* (Kishida, 1920) (type locality: Shiroyama, Kagoshima-shi), *H. kimurai higoensis* Haupt, 1983 (Kumamoto, North Kyushu), *H. kimurai amamiensis* Haupt, 1983 (Amami-oshima Island) and *H. kimurai yanbaruensis* Haupt, 1983 (Okinawa Island). Subsequently, Ono (2009) regarded all of these (plus some new taxa) as distinct species and this view has been adopted in the World Spider Catalog of Platnick (2014). Applying this current species concept to the Berlin material we now have voucher material from three *Heptathela* species. Note that Tanikawa's attempts to explain the species diversity of Japanese *Heptathela* (see Tanikawa et al. 2006; pers. comm. of A. Tanikawa to H. Ono) have not found favour;

Fig. 2: Representative examples, plus their labels, from each of the three mesothele genera in the MfN collections. a. *Liphistius desultor* Schiödte, 1849 (juvenile). b. *Heptathela kimurai* (Kishida, 1920). c. *Ryuthela nishihirai* (Haupt, 1979). The latter two originated from the Joachim Haupt collection.

partly because of the large number of heterogeneous populations with a scattered distribution, but still often adjacent to one another.

Heptathela kikuyai Ono, 1998
Material: ZMB 48317, 1 exuvia; Oita, Kyushu, JAPAN; [leg. J. Haupt], VIII.2004. ZMB 48318, 48342, 48345–47, 5 specimens; Oita, Kyushu, JAPAN; leg. J. Haupt, 25.III.2004.
Remarks: Originally labelled as *H. kimurai*, the geographical origin of these specimens – from Oita in Kyushu, the most southerly of Japan's four main Islands – implies that they should probably be *H. kikuyai* (sensu Ono 1998) which is common there; although we concede that several *Heptathela* species are known from this island (P. Schwendinger pers. comm.). The locality details are nonetheless a little vague as there is both an Oita Prefecture and a more specific locality of Oita-shi (= Oita City) in Kyushu. We assume the specimens come from somewhere in the wider Oita area.

Heptathela kimurai (Kishida, 1920) (Fig. 2b)
Material: ZMB 48319, 1 specimen; Shiroyama, Kagoshima, Kyushu, JAPAN; leg. J. Haupt, date uncertain. ZMB 48341, 1 specimen; Kirishima, Kyushu, JAPAN; leg. J. Haupt, 23.III.2004.
Remarks: Schwendinger & Ono (2011) noted that this species is known from several localities in southern Kyushu where the species is endemic. ZMB 48319 is topotypic; the type specimen also originated from Shiroyama. ZMB 48341 could be from the Kirishima Shrine at Kirishima-shi, from Kirishima-shi (= Kirishima City) itself or from Mt. Kirishima situated on the border of Kagoshima and Miyazaki Prefectures.

Heptathela yanbaruensis Haupt, 1983
Material: ZMB 48316, 1♂; JAPAN, locality uncertain; leg. J. Haupt, I.2006. ZMB 48320, 1 specimen; Iii (as "Jii"), Kunigami-son, Okinawa Island, JAPAN; leg. J. Haupt, 15.IV.1979.
Remarks: These specimens were originally labelled *Heptathela kimurai yanbaruensis*, as per Haupt's (1983) original description. However, as noted above, Ono (2009) recognised *H. yanbaruensis* as a distinct species; see also Schwendinger & Ono (2011). The species is currently recorded as endemic to Okinawa in the Ryukyu Islands (cf. Platnick 2014) which form an island chain from Kyushu in the north towards Taiwan in the south. On the basis of the current data the distributional range of *H. yanbaruensis* can be restricted to the northern part of Okinawa Island (the Yanbaru area), thus ZMB 48316 probably comes from this part of Okinawa too. The holo- and paratypes of this species were explicitly noted as having been deposited in the Zoologisches Museum Hamburg (cf. Haupt 1983: 284). The present material, collected in 2006, cannot thus be part of the type series.

Ryuthela Haupt, 1983
Remarks: The genus *Ryuthela* is restricted to the Ryukyu Islands (e.g. Tanikawa 2013, fig. 1).

Ryuthela ishigakiensis Haupt, 1983
Material: ZMB 48337, 1 specimen, Mt. Omotodake, Ishigakijima Island, Yaeyama Islands, Ryukyus, JAPAN.
Remarks: Originally labelled as *R. nishihirai* (Haupt, 1979), the locality details (Ishigakijima Island) indicate that it belongs to the endemic subspecies *R. nishihirai ishigakiensis* Haupt, 1983. This taxon was elevated to species level by Ono (1997). The holo- and paratypes of this species were explicitly noted as having been deposited in the Zoologisches Museum Hamburg (cf. Haupt 1983: 287–288). The specimen in the MfN also comes from the same locality as the types, however there is no explicit indication that the Berlin example belongs to the type series.

Ryuthela nishihirai (Haupt, 1979) (Fig. 2c)
Material (all from Okinawa Prefecture, JAPAN): ZMB 24561, 2♂, 1♀; Sueyoshi [spelled Suyeyoshi on label], Shuri in Naha-shi, leg. J. Haupt, 18.IV.1980/XI.1981. ZMB 48312, 1 egg case, 1977/78. ZMB 48314, 1 egg case, 1977. ZMB 48326, 1 exuvium; Lake Ryutan, Shuri-mawashi-cho, Naha-shi, 28.III.1996. ZMB 48327, 1 exuvium; Chibana (area name of Okinawa-shi), 16.VI.1982. ZMB 48328, 1 exuvium; Lake Ryutan, Shuri-mawashi-cho, Naha-shi, 20.III.1996. ZMB 48329, 1 exuvium; Chibana, 15.IX.1997. ZMB 48330, 1 exuvium; Funaura Iriomote, 28.III.1996. ZMB 48331, 1 exuvium; Nago-dake, northern part of Okinawajima Island, 28.III.1996. ZMB 48332, 1 exuvium; Unten area, Nakijin-son, Kunigami-gun Okinawajima Island, 24.VII.1997. ZMB 48333, 1 exuvium; Lake Ryutan, Shuri-mawashi-cho, Naha-shi, 28.III.1996. ZMB 48334, 1 exuvium; Lake Ryutan, Shuri-mawashi-cho, Naha-shi, 24.VII.1997. ZMB 48335, 1 exuvium; Su-

eyoshi [spelled Suyeyoshi on label], Shuri in Naha-shi, 28.III.1996. ZMB 48336, 2 specimens, Sueyoshi [as Suyeyoshi (sic)], Shuri in Naha-shi, leg. Haupt, 27.VII.1993. ZMB 48338, 1 specimen; Sueyoshi [as Suyeyoshi (sic)], Shuri in Naha-shi, Okinawa, Japan, leg. Haupt, 27.VII.1993. ZMB 48339, 2 specimens; Sueyoshi [as Suyeyoshi (sic)], Shuri in Naha-shi, leg Haupt, 27.VII.1993. ZMB 48533, 1 juv.; "Matoba", leg. Haupt, 18.IV.1995. ZMB 48534, 1 juv.; [Lake] Ryutan, Shuri-mawashi-cho, Naha-shi, leg. Haupt, 22.IV.1995. ZMB 48535, 1 ♀ [abdomen only]; Chibana, leg. Haupt, VIII.1993.

Remarks: The syntype series is reported to have consisted of three males and females collected in March 1976 by M. Nishihira and J. Haupt in Shuri, Okinawa (see Haupt 1979: 372–373). Two pairs were deposited in the Free University Berlin. This is **not** associated with the Museum für Naturkunde which was formally part of the Humboldt-University in Berlin, whereby the FU Berlin unfortunately has no designated zoological museum and/or curator. A further type in the National Science Museum Tokyo under the repository numbers NSMT-Ar 422-423. Three additional pairs (improperly designated as paratypes by Haupt) were cited as being in the author's personal collection. Some specimens listed above come from Lake Ryutan and Sueyoshi – which lies in the Shuri area – thus it is possible that they are part of the original material (the "paratypes") examined by Haupt. However, since their collecting dates (1980–81, 1993) post-date the collecting (1976) and description (1979) of the type material, they cannot be the "paratypes" from the author's private collection. At present the whereabouts of these specimens are unknown. They could not be traced during a recent survey of Haupt's material deposited in Rostock, which seems to contain only a single (non-type) *Liphistius* specimen as a representative of the mesotheles (JAD pers. observ. in 2013). Note that ZMB 48330 is associated with a locality (Iriomotejima Island) which is notably south-west of Okinawa Island. This exuvia could come from a specimen belonging to the island endemic *Ryuthele taniwakai* (see below).

Ryuthela tanikawai Ono, 1997, **spec. reval.**

Material: ZMB 48325, 1 exuvia; Funaura, Iriomotejima Island, JAPAN, 23.VIII.1991.

Remarks: Originally labelled as *R. nishihirai*, its locality data implies that it belongs to the subsequently recognised and endemic *R. tanikawai*. Recently Tanikawa (2013a) noted that some species are based on female genital characters only which may be strongly variable within populations, and thus suggested that *R. tanikawai* is a junior synonym of *R. ishigakiensis* (see above). This nomenclatural act was also accepted in the latest version of the World Spider Catalog (Platnick 2014). However, we suggest here that this synonymy is inappropriate. Our critique would be that Tanikawa (2013a) sank taxa based initially on morphological data alone, and then in a paper directly following on from the first (Tanikawa 2013b) offered additional DNA data albeit based on this new nomenclature only. In our opinion it would have been better to conduct a genetic analysis of all the available populations first, and then discuss the taxonomic implications afterwards. Both morphological differences in the male palp (Ono 2009) and molecular data (Tanikawa 2013b) may support the hypothesis of past isolation of a *Ryuthela* population on Iriomotejima Island. Further study of this species (or subspecies?) recognition problem by one of us (HO) is currently in preparation and we refer to this forthcoming work for details.

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The spitting spider genus *Scytodes* (Araneae: Scytodidae) in Iran

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Abstract. A survey of spiders of the genus *Scytodes* Latreille, 1804 in Iran resulted in six species occurring in this country: *Scytodes fusca* Walckenaer, 1837, *S. strandi* Spassky, 1941, *S. thoracica* (Latreille, 1802), *S. univittata* Simon, 1882 and – recorded for the first time – *S. arwa* Rheims, Brescovit & van Harten, 2006 and *S. makeda* Rheims, Brescovit & van Harten, 2006. Illustrations of the newly recorded species and a key to all known Iranian species are presented.

Keywords: faunistics, Iran, new records

Zusammenfassung. Die Speispinnengattung *Scytodes* (Araneae: Scytodidae) im Iran. Im Laufe einer Untersuchung der Gattung *Scytodes* Latreille, 1804 im Iran, konnten insgesamt sechs Arten nachgewiesen werden: *Scytodes fusca* Walckenaer, 1837, *S. strandi* Spassky, 1941, *S. thoracica* (Latreille, 1802), *S. univittata* Simon, 1882, *S. arwa* Rheims, Brescovit & van Harten, 2006 und *S. makeda* Rheims, Brescovit & van Harten, 2006, wobei die beiden letztgenannten Arten Erstfunde für den Iran sind. Es werden Zeichnungen der erstmals im Iran erfassten Arten und ein Bestimmungsschlüssel für alle iranischen *Scytodes*-Arten präsentiert.

With 229 species, Scytodidae Blackwall, 1864 is a small family of araneomorph, haplogyne spiders with a worldwide distribution (Platnick 2014). They are commonly known as 'spitting spiders' since they have extra silk glands in their chelicerae which they use to eject a mixture of venom, silk and a gluey substance for capturing prey (Monterosso 1928). These glands extend into the prosoma, giving them a hunchback-shaped cephalothorax. Of the five known genera, *Scytodes* Latreille, 1804 is the largest and most widely distributed (Platnick 2014). Four species have so far been reported from Iran: *Scytodes fusca* Walckenaer, 1837, *S. strandi* Spassky, 1941, *S. thoracica* (Latreille, 1802) and *S. univittata* Simon, 1882. The aim of the present study was to make a survey of this genus in Iran, which also yielded records of two species new to the fauna of this country. To help identify *Scytodes* in future studies a key to the Iranian species is presented.

Methods

Specimens were collected by hand or using entomological aspirators in different parts of Iran, by turning stones, investigating leaf litter and crevices in rocks. The vulvae of females were removed and immersed in cold KOH and later examined and photographed using a Canon EOS-1Ds Mark III, attached to a Nikon SMZ-1000 stereo microscope. Specimens were deposited in the Jalal Afshar Zoological Museum of the University of Tehran (JAZM, curator Dr. Alireza Sabouri).

Scytodes species recorded in Iran

Scytodes arwa Rheims, Brescovit & van Harten, 2006 (Fig. 1)

Material. 1 ♂ (JAZM), IRAN: Hormozgan Province: Hormuz Island, 27°02'42"N 56°29'35" E, 11 m a.s.l., Jan. 2014, leg. Zamani & Kazemi.

This species – which is known only from males – can be separated from other species of *Scytodes* (except *S. univittata*) by the shape of the palpal organ, the two rows of spines on femur I and the single row of spines on metatarsus III. It can be distinguished from *S. univittata* by the presence of two rows of spines on femur IV, and the shape of the extension on the apical section of the bulb, which is hyaline, large and triangular, rather than being sclerotized, small and rounded as in *S. univittata* (Rheims et al. 2006, figs. 6-11).

Distribution

This species was so far only recorded from Yemen (Rheims et al. 2006) and is reported from Iran here for the first time.

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Fig. 1: *Scytodes arwa*. A: habitus of male; B: male right palp, prolateral view; C: male right palp, retrolateral view

Habitat in Iran
This species was found in a sandy, rocky habitat near the sea, in co-habitation with *S. makeda*.

***Scytodes makeda* Rheims, Brescovit & van Harten, 2006 (Fig. 2)**
Material. 2 ♀ (JAZM), IRAN: Hormozgan Province: Hormuz Island, 27°02'42" N 56°29'35" E, 11 m a.s.l, Jan. 2014, leg. Zamani & Kazemi.

This species – which is known only from females – can be separated from other species of *Scytodes* by its bean-shaped spermathecae, U-shaped ducts and sclerotized plates on the sides of the spermathecae (Rheims et al. 2006, figs. 12-14).

Distribution
This species was so far only recorded from Yemen and Oman (Rheims et al. 2006) and is reported here from Iran for the first time.

Habitat in Iran
This species was found in a sandy, rocky habitat near the sea, in co-habitation with *S. arwa*.

***Scytodes strandi* Spassky, 1941**
Material. 1 ♀ (JAZM), IRAN: Tehran Province: Tehran, Tochal mountains, 35°49'40"N, 51°24'15"E, 1912 m a.s.l., May 2013, Zamani leg.

This species is similar to *S. kinzelbachi* Wunderlich, 1995, but can be separated by the shorter, more sclerotized apophysis of the psembolus in males, and a different conformation of the spermathecae in females (Özkütük et al. 2013, fig. 3).

Distribution
Iran, Central Asia (Platnick 2014). This species has been previously reported from Mazandaran (Ghahari & Marusik 2009) and Tehran (Özkütük et al. 2013) Provinces in Iran and our single female specimen was also collected from Tehran.

Fig. 2: *Scytodes makeda*. A: habitus of female; B: vulva, dorsal view; C: left spermathecae and copulatory duct

Habitat in Iran
One adult specimen was found along with some juveniles in a rocky, mountainous habitat near a small waterfall.

***Scytodes univittata* Simon, 1882**
Material
1 ♀ 1 ♂ (JAZM), IRAN: Tehran Province: Tehran, May 1994, leg. Savoji. 1 ♀ (JAZM), IRAN: Fars Province: Kangan, 27°58' N, 51°59' E, 552 m a.s.l., Dec 2013, leg. Mirzaee.

Males of this species are diagnosable by the presence of two rows of spines on femur I, a single prolateral row of spines on metatarsus III and by their embolus, which has a sclerotized basal projection. Females are diagnosable from other species by their v-shaped foveae and curved, deep positioning ridges (Brescovit & Rheims 2000, figs. 11-20).
Distribution
Canary Is. to Myanmar, synanthropic in the Neotropics (Platnick 2014). This species has been previously reported from Fars and Mazandaran Provinces in Iran (Özkütük et al. 2013). This is the first record from Tehran Province.
Habitat in Iran
The new specimens were found in rocky plain habitats.

***Scytodes thoracica* (Latreille, 1802)**
Distribution
Holarctic, Pacific Is. (Platnick 2014). This species has been reported in Iran from the Caspian Sea (Roewer 1955), and the Provinces Zanjan (Ghavami 2006), Golestan (Ghavami 2006, Kashefi et al. 2013) and Khorasan (Mirshamsi 2005) previously. No additional material was found during the present study.

***Scytodes fusca* Walckenaer, 1837**
Distribution
Pantropical (Platnick 2014). This species has been previously reported in Iran (albeit questionably; see below) from Kerman Province, based on a single female specimen (Roewer 1955). No additional material was found during the present study.

Key to *Scytodes* species of Iran

1. Male 2
   Female 6
2. Femur I with spines 3
   Femur I spineless 5
3. Femur IV with spines (see Rheims et al. 2006, fig. 11) ..... *S. arwa*
   Femur IV spineless 4
4. Metatarsus III with spines (see Özkütük et al. 2013, fig. 4) ..... *S. univittata*
   Metatarsus III spineless ..... *S. fusca*

5. Terminal part of bulbous as long as basal part, apophysis fine (see Özkütük et al. 2013, fig. 6) . . . . . *S. thoracica*
   Apophysis thicker than stylus and sub-equal in size (see Özkütük et al. 2013, fig. 3) . . . . *S. strandi*
6. Spermathecae strongly curved (see Brescovit & Rheims 2000, figs. 5-8) . . . . . *S. fusca*
   Spermathecae mildly curved, or not curved 7
7. Spermathecae bean-shaped . . . . . *S. makeda*
   Spermathecae not bean-shaped 8
8. Scutula straight (see Özkütük et al. 2013, fig. 3) . . . . . *S. strandi*
   Scutula not straight 9
9. Scutula triangular (see Özkütük et al. 2013, fig. 4) . . . . . *S. univittata*
   Scutula semi-rounded (see Özkütük et al. 2013, fig. 6) . . . . . *S. thoracica*

Discussion

Based on the present study, *Scytodes* is represented in Iran by six species, which in comparison to some adjacent and nearby countries – e.g. Turkey with three species (Bayram et al. 2014), Russia and its adjacent countries with four species (Mikhailov 2013) and Central Europe with two species (Šestáková et al. 2014) – represents a rather rich fauna of spitting spiders. The present study offers the first records of *S. arwa* and *S. makeda* outside the Arabian Peninsula, but considering the position of Hormuz Island relative to Yemen and Oman, their occurrence in this part of Iran is not surprising. In fact another species which might be expected on Hormuz Island is *S. bilqis* Rheims, Brescovit & van Harten, 2006; also originally described from Yemen. It should be mentioned that Mozaffarian & Marusik (2001) suggested that because *S. fusca* is widely distributed in Central America and occurs throughout the tropics, the single female Iranian specimen was misidentified; thus the true presence of this species in Iran remains doubtful.

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Arachnologische Mitteilungen 47: 45-48 Karlsruhe, Mai 2014

The long-lasting story of the wrong naming of *Silometopus ambiguus* as *S. curtus* (Araneae: Linyphiidae)

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Abstract. *Silometopus ambiguus* (O. Pickard-Cambridge, 1905) is a species occurring in coastal habitats from north-eastern to western Europe. *S. curtus* (Simon, 1881), occurring in southern France and north-eastern Spain, was for a long time mixed up with *S. ambiguus*, even though corrections have been published very early and several times. This contribution summarizes publications on this topic, discusses doubtful records of both species and proposes corrections for the World Spider Catalog; and thus tries to avoid repetitions of the mistake in the future.

Keywords: coastal habitats, spider, taxonomy

Zusammenfassung. Die lange Geschichte der Fehlbenennung von *Silometopus ambiguus* als *S. curtus* (Araneae: Linyphiidae). *Silometopus ambiguus* (O. Pickard-Cambridge, 1905) kommt in Küstenlebensräumen von Nordost- bis nach Westeuropa vor. *S. curtus* (Simon, 1881), die aus Südfrankreich und Nordost-Spanien bekannt ist, wurde über viele Jahrzehnte mit *S. ambiguus* verwechselt, obwohl Berichtigungen frühzeitig und mehrfach publiziert wurden. Dieser Beitrag stellt die Publikationen zum Thema zusammen, diskutiert fragliche Nachweise beider Arten und schlägt Korrekturen für den World Spider Catalog vor. Weitere Wiederholungen dieses Fehlers sollen so in Zukunft verhindert werden.

***Silometopus curtus* (Simon, 1881)** was described by Simon (1881: p. 253, sub *Erigone curta*) based on males from France and Spain. Shortly after he transferred the species to *Cnephalocotes* and figured it (the male palpus) for the first time (Simon 1884: 704). Later, i.e. posthumously, he transferred the species to the new genus *Silometopus* Simon, 1926 and designated it as its type species (Simon 1926: 353). The female epigyne was first figured by Denis (1950: 66, Figs 5-9, sub *S. nitidithorax* (Simon, 1914); corrected by Denis 1963: 396) and the vulva by Locket (1964: 267, Fig. 3D). Denis (1963: 395, Figs 2-3) and Locket (1964: 266, Figs 2A-B) re-figured the tibial apophysis of the male palpus.

Silometopus curtus is known only from southern France (Bouches-du-Rhônes: les Martigues; Camargue: several sites) and north-eastern Spain (Catalonia: Arbúcies) (Simon 1881: 253, 1884: 704, 1926: 487; Denis 1950: 66, sub *S. nitidithorax*).

Furthermore Simon mentioned a slightly different and larger male from Egypt (Alexandria) (Simon 1884: 704, 1926: 487) which he considered merely to be a variety of *S. curtus*. This seems to be very doubtful and should be re-examined.

***Silometopus ambiguus* (O. Pickard-Cambridge, 1905)** was described by Pickard-Cambridge (1905: 67, pl. A, Figs 16-19) from Scotland (Isle of Bute) after a male he had formerly published as *S. curtus* (Pickard-Cambridge 1894: 112, Fig. 4, sub *Cnephalocotes*). Locket & Millidge (1953: 251) figured both, *S. ambiguus* and *S. curtus*, but Locket et al. (1974: 88) corrected this noting that all figures from 1953 belong to *S. ambiguus*. Denis (1963) and Locket (1964) clarified that *S. curtus* is a Mediterranean species and *S. ambiguus* occurs in coastal habitats in northern and western Europe. Since this time in Great Britain and Ireland the correct name, *S. ambiguus*, has been used exclusively. Brændegård (1958) and Wiehle (1960, 1961) erroneously used the name *S. curtus* for records in Iceland and Germany. Also Casemir (1970: Germany) and Palmgren (1976: Finland) used the name *S. curtus*, even though they should have known, or even cited, the papers by Denis (1963) and Locket (1964). Both names can be found even in the spider literature from the last two decades, e.g., *S. curtus*: Koponen & Fritzén (2013), Blick et al. (2004), Helsdingen (1999, 2013); *S. ambiguus*: Agnarsson (1996), Scharff & Gudik-Sørensen (2011), Platen et

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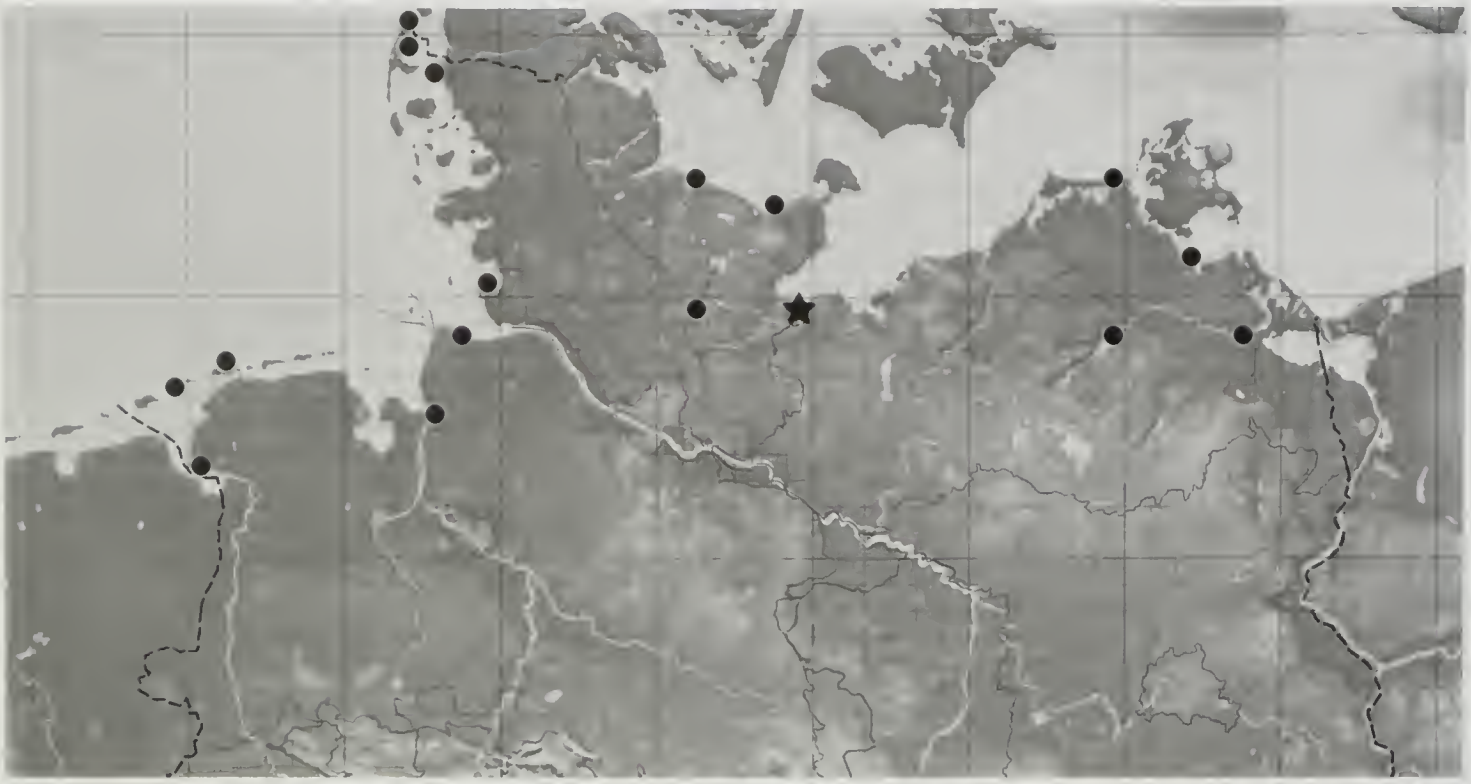

Fig. 1: Map of the records of *Silometopus ambiguus* in northern Germany (Staudt 2014)
Abb. 1: Karte der Nachweise von *Silometopus ambiguus* in Norddeutschland (Staudt 2014)
★ = record after 1999/Nachweis nach 1999

al. (1995), Tanasevitch & Koponen (2007), Bosmans (2009).

Silometopus ambiguus is the valid name of the species occurring on or near the coast from north-eastern European Russia (the north-easternmost records are from Vorkuta and south of the Yamal Peninsula, both north of the Urals, Tanasevitch & Koponen 2007: 320, Tanasevitch 2008: 129), Finland, Norway, Iceland, Great Britain, Ireland, Denmark, Germany, Netherlands, Belgium and France (the southernmost record is from the Atlantic coast of Vendée; Le Peru 2007: 184).

The records from Germany (Fig. 1) show:
That the species is known from the North Sea coast as well as from the Baltic Sea coast. The records from the Baltic Sea lead to the assumption, that records of *S. ambiguus* can be expected also in Poland, Sweden and the three Baltic states, Lithuania, Latvia and Estonia; it is already known from Finland (sub *S. curtus*: Palmgren 1976, Koponen & Fritzén 2013).
There are single records not directly on the coast. This fact is supported by single records from Great Britain up to 280 m a.s.l. (BAS 2014) and single inland records from Iceland (Agnarsson 1996: 89-90).
There are scarce recent spider data from the German coast.

Distinguishing the species. The most important contribution towards distinguishing the two species was made 50 years ago by Locket (1964). He comparatively figured the tibial apophysis of both species and provided the vulvae for the first time (Figs 2-3). Furthermore he noted (Locket 1964: 266): "Simon himself appears to have confused the two species, a tube from his collection labelled "Silom. curtus. Gallia" contained two males of the Mediterranean form and one of the other." For other figures see Platnick (2014).

Fig. 2: A. *Silometopus curtus* male tibial apophysis (dorsally). B. ditto (from a little inside). C. *S. ambiguus* male tibial apophysis (ditto) (after Locket 1964: p. 66, Figs 2A-C).
Abb. 2: A. *Silometopus curtus* männliche Tibialapophyse (dorsal). B. dito (ein wenig von innen). C. *S. ambiguus* männliche Tibialapophyse (dito) (after Locket 1964: p. 66, Figs 2A-C).

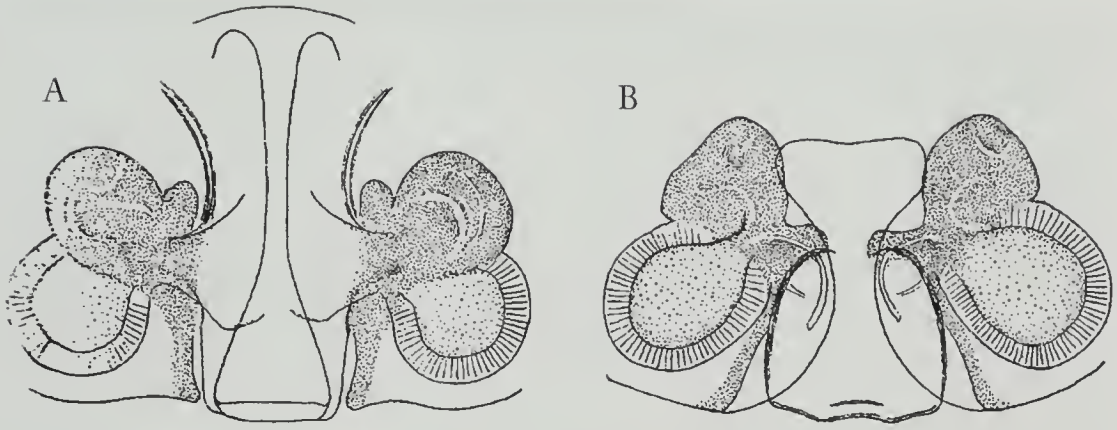

Fig. 3/Abb. 3: A. *Silometopus ambiguus* vulva. B. *S. curtus* vulva (after Locket 1964: p. 67, Figs. 3C-D).

Records to be checked. There are published records of *S. ambiguus* from Spain (Majadas & Urones 2002, Moreno 2005, Cardoso & Moreno 2010: two from Central Spain, Ávila and Salamanca, one near the Mediterranean coast from Tarragona, Catalonia). These records should be checked thoroughly as well as the records of *S. ambiguus* from Albania (Deltshev et al. 2011) and of *S. curtus* from Hungary (Samu & Szinetár 1999: listed as "possibly uncertain record", origin: Loksa 1991), Malta (Kritscher 1996) and Egypt (see above) (compare the maps in Nentwig et al. 2014, created on the basis of Helsdingen 2013).

Catalogue. The following citations in the World Spider Catalog (Platnick 2014) are still attached to *S. curtus*, but in fact belong to *S. ambiguus*:

- *Cnephalocotes curtus* O. Pickard-Cambridge 1894: 112, f. 4. (misidentified per Pickard-Cambridge 1905: 67)
- *S. curtus* Locket & Millidge 1953: 251, f. 153A, H (mf). (misidentified per Locket et al. 1974: 88)
- *S. curtus* Brændegård 1958: 47, f. 38-39 (mf). (misidentified, see above)
- *S. curtus* Wiehle 1960: 278, f. 506-509 (mf). (misidentified per Locket et al. 1974: 88)
- *S. curtus* Wiehle 1961: 180, f. 17 (f). (misidentified per Locket et al. 1974: 88)
- *S. curtus* Casemir 1970: 210, f. 4.1-2, pl. I, f. 3 (mf). (misidentified, see above)
- *S. curtus* Palmgren 1976: 98, f. 20.15-16 (mf). (misidentified, see above)

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Erstnachweis der Springspinne *Icius hamatus* (Salticidae, Araneae) für Deutschland

Michael Schäfer & Antje Deepen-Wieczorek

doi: 10.5431/aramit4708

Abstract. First record of the jumping spider *Icius hamatus* (Salticidae, Araneae) in Germany. A male of the jumping spider *Icius hamatus* (C. L. Koch, 1846) was found in a garden in Aachen (Germany, North Rhine-Westphalia). Establishment of this species in Germany cannot yet be proven.

Keywords: distribution, Europe, new faunistic record, spider

Zusammenfassung. Ein Männchen der Springspinne *Icius hamatus* (C. L. Koch, 1846) wurde in einem Garten in Aachen (Nordrhein-Westfalen) nachgewiesen. Eine Etablierung in Deutschland kann noch nicht belegt werden.

Die Gattung *Icius* ist in Europa mit sieben Arten vertreten, deren Verbreitungsschwerpunkt in Südeuropa liegt (Platnick 2014). *Icius hamatus* (C. L. Koch, 1846) ist im Mittelmeerraum weit verbreitet. Hansen (1982) äußerte nach Sichtung aller Literaturdaten die Vermutung, die Art komme in der Ebene oder im Hügelland bevorzugt in der Strauchschicht vor, sei „sehr wahrscheinlich aber nicht an sie gebunden". Metzner (1999) gibt als Fundorte neben „Gebüschen, Waldrand, Laubwäldern" auch „Flussufer und Quellrand" an.

Bisher wurde die Art in Europa für Portugal, Spanien, Frankreich mit Korsika, Italien mit Sardinien und Sizilien, Slowenien, Kroatien, Serbien, Rumänien, Albanien, Griechenland, die Türkei und Polen nachgewiesen (Nentwig et al. 2014). Bei letzterem handelt es sich um eine Einschleppung zusammen mit Granatäpfeln, die vermutlich aus Spanien stammten (Tomasiewicz & Wesołowska 2006).

Abb. 1: *Icius hamatus* Männchen, Dorsalansicht
Fig. 1: *Icius hamatus* male, habitus dorsal

Fundort, Material und Methoden

Am 15.03. 2013 wurde in einem privaten Garten in Nordrhein-Westfalen, Aachen, Brand, Niederforstbach, 248 m. ü. N.N. (WGS84: 50.7395°N, 6.1583°E, TK25: 5202) ein adultes Männchen von *Icius hamatus* (Abb. 1-2) gefunden (leg. A. Deepen-Wieczorek, det. M. Schäfer). Es hielt sich dort unter einem Stein auf. Der relativ feuchte Fundort und seine Umgebung sind im Jahresverlauf mit einer dichten Krautschicht aus Gräsern und Stauden bewachsen. Ab Mitte März bildet sich hier je nach Witterung rasch dichter Bewuchs aus.

Das Tier wurde als Beleg in 70% Ethanol konserviert und in der Sammlung Schäfer unter der Nummer M130032 archiviert.

Bestimmung

Die Bestimmung des Männchens erfolgte mit Hilfe von Andreeva et al. (1984: 350, f. 1-5), Alicata & Cantarella (1994: 116, f. 1,7,13, 18-36), Metzner (1999: 96, f. 61 a-l) und Prószynski (1976: 233, f. 403-406).

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Abb. 2: *Icius hamatus* Männchen, linker Pedipalpus
Fig. 2: *Icius hamatus* male, left palp

Diskussion

Als wahrscheinlich wärmeliebende Gattung mit mediterranem Verbreitungsschwerpunkt ist *Icius* eigentlich nicht als Mitglied der deutschen Fauna zu erwarten. Lediglich für einen Vertreter dieser Gattung (*Icius subinermis* Simon, 1937) existieren bereits zwei Nachweise für Deutschland. Zum einen aus einem Gewächshaus des Botanischen Gartens in Köln (Jäger 1995) und zum anderen ein unpublizierter Fund aus dem Saarland, der auf den Verbreitungskarten der Arachnologische Gesellschaft (Staudt 2014) verzeichnet ist. Im Gegensatz zum Fund aus Köln deutet bei letzterem der Fundort (die Hauswand eines Wohnhauses, Staudt pers. Mitt.), allerdings nicht explizit auf eine eventuelle Einschleppung hin.

Der nächstgelegene Fundort von *Icius hamatus* liegt ca. 700 km südwestlich von Aachen, im französischen Département Charente (Le Peru 2007).

Da es sich bei dem hier publizierten Nachweis um einen Einzelfund handelt, dessen Fundort sich zudem in unmittelbarer Nähe zu bebautem Gebiet befindet, ist die Wahrscheinlichkeit einer einmaligen Einschleppung durch z.B. Warentransporte oder Kraftfahrzeuge relativ hoch. Eine zeitnahe Einschleppung mit Stauden oder Baumaterialien durch den Besitzer des Gartens kann jedoch ausgeschlossen werden, da die letzen Jahre keine Neubepflanzungen oder Baumaßnahmen stattgefunden haben.

Es bleibt daher offen, ob es sich hier um eine einmalige Einschleppung handelt oder die Art bereits am Standort Fuß gefasst hat. Eine intensive Nachsuche im Gebiet und angrenzenden Bereichen ist daher für eine Klärung, ob und in welchem Umfang die Art eventuell etabliert ist, unbedingt notwendig.

Danksagung
Vielen Dank an Theo Blick für die unkomplizierte Betreuung des Manuskripts sowie an Tobias Bauer für die wertvollen Tipps und vor allem für seine Motivation, ohne die es diese Publikation sicherlich nie gegeben hätte.

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Nachruf

Joachim Haupt ist tot – ein sehr persönlicher Nachruf
Joachim Haupt is dead – a very personal obituary

Schreibt man etwas über einen bedeutenden Forscher, so stehen im allgemeinen seine wissenschaftlichen Verdienste im Mittelpunkt; lange Publikationslisten, besondere Beiträge, die zu einem bedeutenden Fortschritt im entsprechenden Wissensgebiet geführt haben, werden „abgearbeitet". Wer den wissenschaftlichen Verdienst von Joachim Haupt (* 13. Januar 1942, † 30. April 2013) bemessen will, der schaue nur in so bedeutende Bücher wie „den Foelix" (Biologie der Spinnen), die „Neurobiology of arachnids" oder die „Ecophysiology of spiders" (Foelix 1992, Barth 1985, Nentwig 1987) – in allen ist Joachim Haupt zitiert, im Überblickswerk über unsere – und seine! – Lieblingstiere ebenso wie in den Spezialwerken. Sowohl an seinen Arbeiten zur Funktionsmorphologie der Trichobothrien als auch an den umfassenden und grundlegenden Untersuchungen mesotheler Spinnen, dieser ganz besonders urtümlichen Spinnen, kommt man nicht vorbei (Haupt 2003).

Und dennoch greift man zu kurz, Joachim auf diese großen wissenschaftlichen Verdienste zu beschränken. Ich hatte die Freude, sowohl in meinem Studium in seiner Vorlesung „Biologie der Spinnentiere" sehr viel lernen zu können als auch am gleichen Institut, dem früheren Institut für Biologie der TU Berlin, mit ihm zusammen arbeiten zu dürfen. Seine Vorlesung war altmodisch, dies aber im besten Sinne. Wenn einer ohne Powerpoint (gab es damals noch gar nicht!), Folien und anderem technischen Schnick-Schnack, nur mit Hilfe von fünf verschiedenfarbigen Kreidestücken, in zwei Vorlesungsstunden die grundlegenden Unterschiede der Hauptgruppen der Articulata darzustellen versteht, und am Ende dieser eineinhalb Zeitstunden dann lehrbuchmäßige Zeichnungen an der Tafel zu sehen sind, ist – oder leider war – das Kunst. Sein Stil lag nicht jedem, es war schon ein kleiner Kreis von Interessierten. Sein profundes Wissen und seine Leidenschaft für den Stoff machten es mir jedenfalls leicht, besonders die Spinnen leidenschaftlich zu vertiefen. Und als er auch noch die europäischen Arachnologen 1988 zum 11. Colloquium nach Berlin holte (Haupt 1988), rückte er für mich damals unbedarften Studi in die Riege der ganz Besonderen auf.

Während der Exkursion am Mittelmeer am Hafen von Banyuls-sur-mer.
During the Mediterranean excursion at the harbour of Banyuls-sur-mer.

Die gemeinsame Arbeit am Institut für Biologie (IfBiol, Technische Universität Berlin) viel später dann war von herzlicher Kollegialität geprägt. Mit seinem oft hintergründigen Humor lag Joachim sehr auf meiner Wellenlänge. Die auch nach vielen Jahren immer noch auf Nadeln aufgespießten Spinnen aus dem Freilandökologischen Praktikum eines professoralen Kollegen gab er gerne mit der süffisanten Bemerkung zurück, die Bestimmung so behandelter Tiere sei „wie schon gesagt" nicht möglich. Auch Neues zu wagen war durchaus seine Sache, in Forschung wie in Lehre. Die Stammesgeschichte seiner

Joachim im Kreis von Studenten und Meerestieren – Lernen am Objekt!
Joachim surrounded by students and sea life – learning from the specimens!

mesothelen Spinnen lag ihm am Herzen. Morphologisch war hier alles klar. Eine neue Professur für Genetik am Institut für Biologie machte es möglich, dies auch auf genetischer Ebene nachzuzeichnen – damals etwas Neues, Besonderes. Auch wenn ihm einige Ergebnisse nicht in sein Muster passten und zu heftigen Diskussionen führten – er fand es spannend und stellte sein kostbares Material zum Mazerieren zur Verfügung! Die Ausbildung der ausschließlich Lehramt Studierenden am IfBiol war sehr festgelegt, man studierte eben das Angebot ab, der Blick über den Tellerrand hinaus wurde nicht eben gefördert. In einem der vielen Gespräche in seinem Büro bemerkte ich fast nebenbei, dass man mal ein meeresbiologisches Praktikum anbieten sollte, als Übersicht über die Stämme des Tierreiches wäre das sinnvoll, und auch in der Lehramtsausbildung nicht schlecht, da die Schülerinnen und Schüler ja eher am Meer Urlaub machen würden als im Grunewald von Berlin. Joachim nutzte seine Kontakte nach Banyuls-sur-mer an die dortige meeresbiologische Station, einige Wochen später war alles unter Dach und Fach (auch hier gibt es Bedeutendes: „Insekten und Spinnentiere am Mittelmeer", verfasst zusammen mit seiner Frau Hiroko, Haupt & Haupt 1993). Es wurden zwei wunderbare Exkursionen! Sie zeigten einmal mehr, dass Begeisterung der Lehrenden auf die Lernenden ansteckend wirkt. Zum anderen zeigten sie Joachim von einer Seite, die man an ihm weder als Student noch als Kollege so vermutet hätte – Lebensfreude und Lebenslust! Sardane tanzen, Wein trinken, am Strand liegen und „nebenbei" Meeresbiologie betreiben, die gefangenen Fische erst biologisch untersuchen und dann fachgerecht grillen und bei einem stimmungsvollen Fest begießen und verspeisen, vorher noch eben eine spannende Landexkursion machen, auf der Hafenmole gemeinsam einen letzten Pastis des Tages einnehmen ...

Leider haben wir uns in den letzten Jahren aus den Augen verloren. Ich wusste nicht, wie schlecht es um ihn gesundheitlich bestellt war. Einigen mag dies wohl aufgefallen sein, zum Beispiel auf Tagungen. Klagen war seine Sache jedenfalls nicht – jedenfalls nicht in großer Runde. Ich war bestürzt, als ich von

seinem Tod erfuhr. Es gibt doch noch so viel zu tun! Die Morphologie mag eine altmodische Wissenschaft sein, mit der man keinen Studi mehr zu einer Bachelor- oder Masterarbeit verführen kann. Es harren aber noch so viele Dinge auf eine Untersuchung. Mikroskop und Elektronenmikroskop waren seine Handwerkszeuge, seine Erfahrung wäre viel wert.

Wenigstens einen Banyuls-Wein hätte ich gerne noch mit ihm getrunken und an „alte Zeiten" gedacht. Noch nicht mal Joachim hat damals Bezugsquellen in Deutschland gekannt. Heute kann man diesen wunderbaren Dessertwein, den er uns auf den Frankreichexkursionen so nahe brachte, im Internet bestellen. Das werde ich wohl tun und ihn im Gedenken an diesen besonderen Kollegen trinken. Es werden Bilder vorüber ziehen von lauen Mittelmeer-Abenden und guten Gesprächen am IfBiol, an Abendessen im Familienkreis, Gespräche über seine Liebe zu Asien und Japan speziell. In Erinnerung bleiben der wissenschaftlich Beharrliche und der Begeisterer – der Biologe, Spinnenforscher und Mensch Joachim Haupt.

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Arachnologische Mitteilungen

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Inhalt/Contents

Anna Šestáková, Ľudmila Černecká, Jonathan Neumann & Nils Reiser: First record of the exotic spitting spider *Scytodes fusca* (Araneae, Scytodidae) in Central Europe from Germany and Slovakia . . . . . .
Neunachweis der exotischen Speispinne *Scytodes fusca* (Araneae, Scytodidae) in Mitteleuropa aus Deutschland und der Slowakei 1-6

Barbara Thaler-Knoflach, Ambros Hänggi, Karl-Hinrich Kielhorn & Bodo von Broen: Revisiting the taxonomy of the rare and tiny comb-footed spider *Carniella brignolii* (Araneae, Theridiidae) . . . . . .
Ergänzungen zur Taxonomie der seltenen Zwergkugelspinne *Carniella brignolii* (Araneae, Theridiidae) 7-13

Christoph Hörweg: Die Gemeine Baldachinspinne, *Linyphia triangularis* (Araneae: Linyphiidae), Europäische Spinne des Jahres 2014 . . . . . .
The common hammock-weaver, *Linyphia triangularis* (Araneae: Linyphiidae), European spider of the year 2014 14-18

Steffen Bayer: Miscellaneous notes on European and African *Cheiracanthium* species (Araneae: Miturgidae) . . . . . .
Verschiedene Anmerkungen über afrikanische und europäische *Cheiracanthium*-Arten (Araneae: Miturgidae) 19-34

Jason A. Dunlop, Corinna Steffensen & Hirotsugu Ono: Mesothele spiders in the Museum für Naturkunde Berlin . . . . . .
Gliederspinnen im Museum für Naturkunde Berlin 35-40

Alireza Zamani: The spitting spider genus *Scytodes* (Araneae: Scytodidae) in Iran . . . . . .
Die Speispinnengattung *Scytodes* (Araneae: Scytodidae) im Iran 41-44

Theo Blick: The long-lasting story of the wrong naming of *Silometopus ambiguus* as *S. curtus* (Araneae: Linyphiidae) . . . . . .
Die lange Geschichte der Fehlbenennung von *Silometopus ambiguus* als *S. curtus* (Araneae: Linyphiidae) 45-48

Michael Schäfer & Antje Deepen-Wieczorek: Erstnachweis der Springspinne *Icius hamatus* (Salticidae, Araneae) für Deutschland . . . . . .
First record of the jumping spider *Icius hamatus* (Salticidae, Araneae) in Germany 49-50

Diversa: Nachruf . . . . . i-iii

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